Vol. I NOVEMBER, 1919 No. 8

THE PAPER INDUSTRY

The Monthly Educational Journal of the Paper Industry

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A Pronouncement

WE wish to extend our most hearty congratulations to THE AMERICAN PULP AND PAPER MILL SUPERINTENDENTS' ASSOCIATION, for their very successful meeting.

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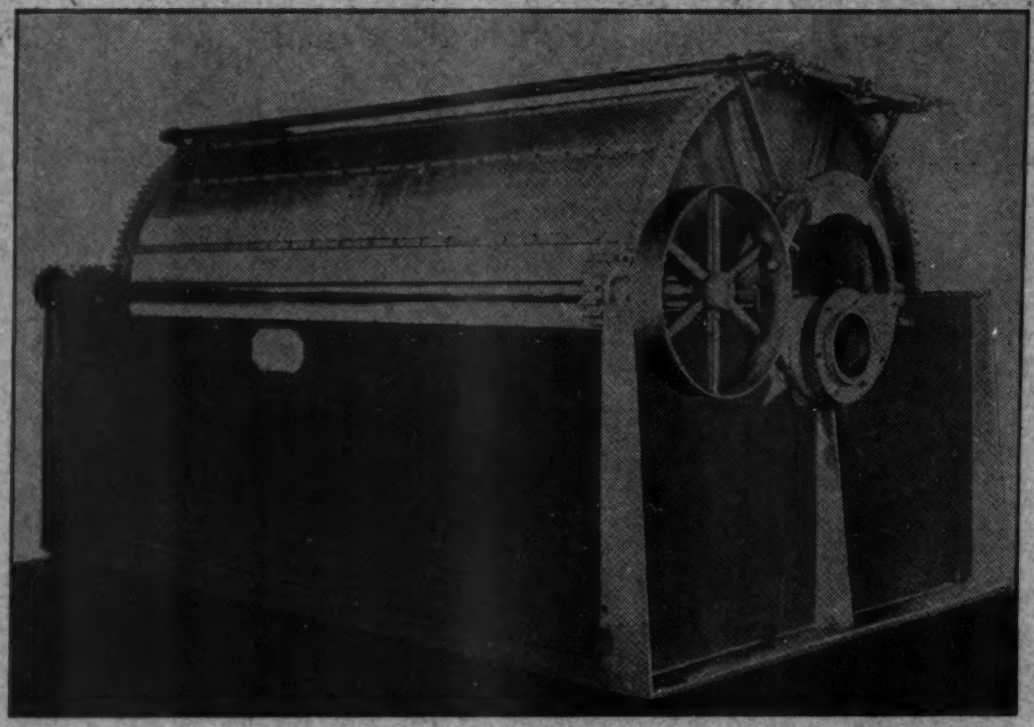

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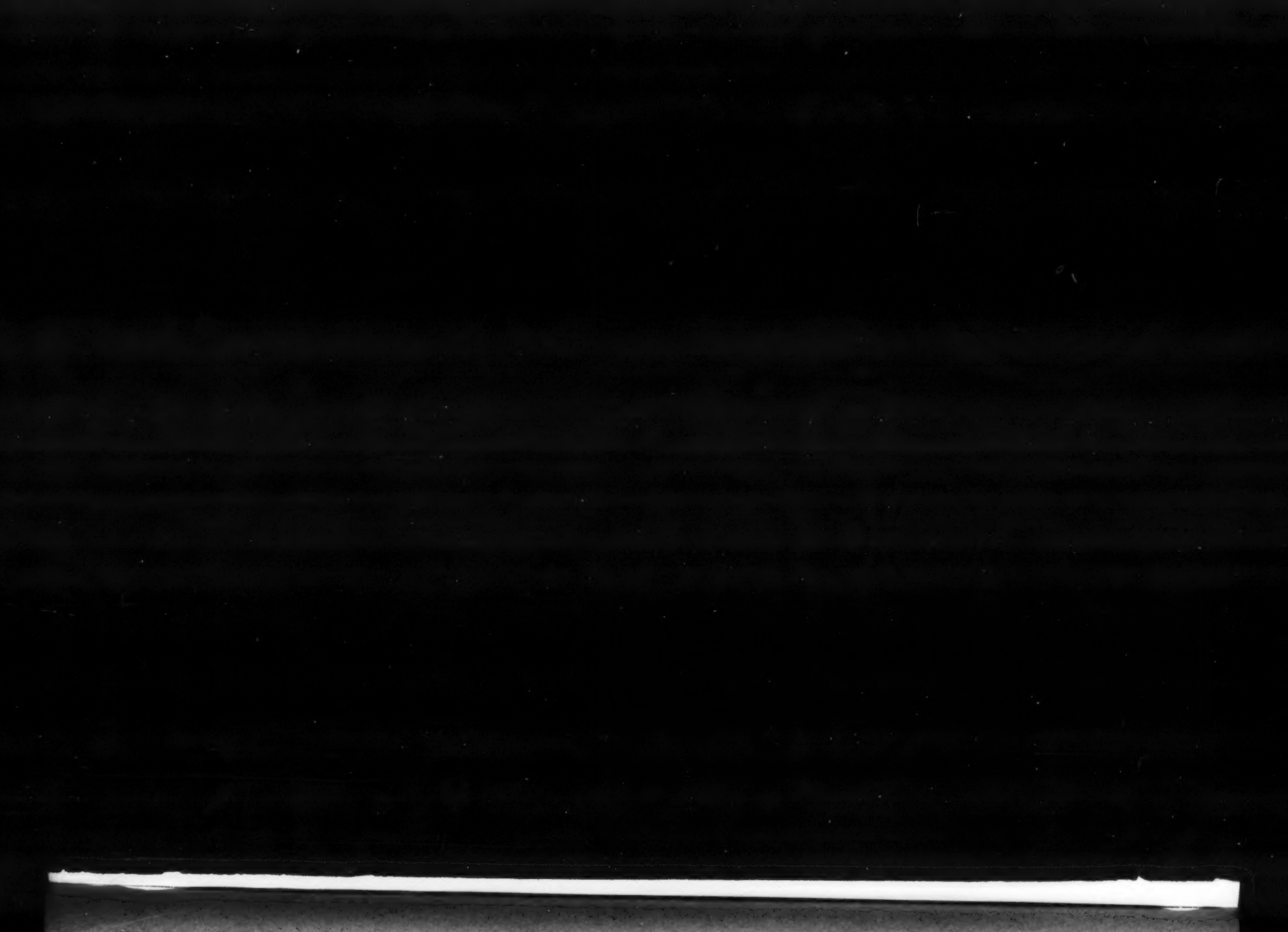

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Vol. 1—No. 8

THE PAPER INDUSTRY

PETER J. MASSEY
Editor

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of The Paper Industry

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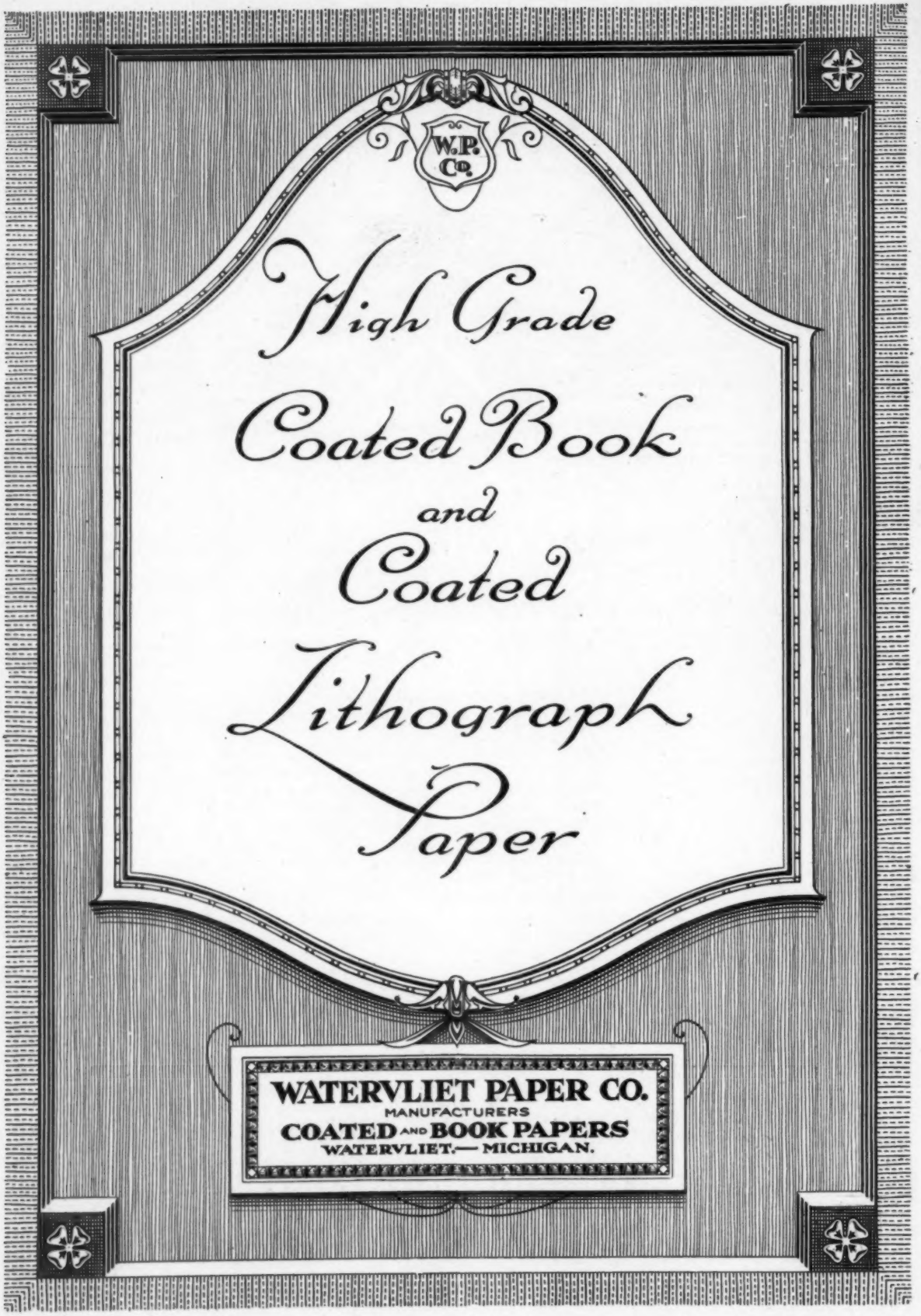
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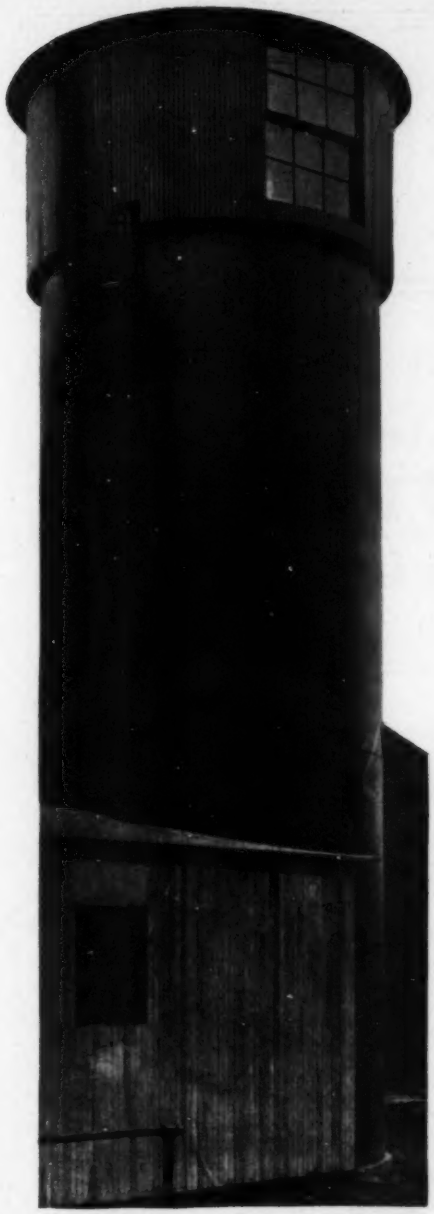

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FOR some months we have been stressing the advantages of using softened water in the process of paper manufacture. This month we want to lay special emphasis on the tremendous fuel saving that can be accomplished by the use of a Bartlett-Graver or a Graver type "K" water softener and purifier.

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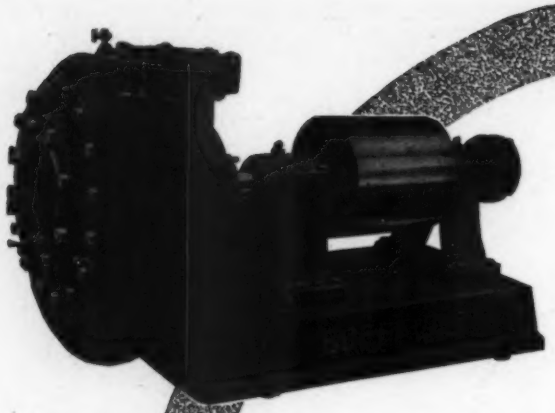
WHEN the president vetoed the bill which killed the daylight saving act, he said he did it because he felt the greatest need in this country was production of the American workshop and mill. This thought is the keynote of the whole trouble that we now seem to be passing through. Recently a business man in Chicago said he was paying his men 80 per cent more than a few years ago, and he did not object to that, as he knew the men had tremendous living expenses, but what he did object to was that while he was paying them this extra wage, they were doing only half the amount of work they had done formerly in a day. A prominent paper manufacturer told the writer recently that his men had been doing only about 59 per cent of the amount they had been doing a few years ago in the same length of time.

It seems to us here is where the trouble lies. During the four years of war and waste everything went, but unless things now change, conditions will be sure to get worse instead of better. It is said to be the argument of a certain class of men that if four men will only do the work of three men, then there will be a job for another man. This argument would not sound so bad if there were great masses of unemployed, but under today's conditions it is nothing less than criminal. Unless every man puts his shoulder to the wheel and puts in his best licks, we will never get out of the condition of chaos that we now seem to be in. Any man, no matter what his position, who shirks his work and wastes his time, under present conditions, is an enemy to his country. Surely an idle mind is the devil's workshop, and the man who puts in just as few hours as possible, and does as little as possible during that time, thinking only of the movements of the hands of the clock, will not get very far, nor does he deserve to.

We must have greater production, smaller consumption and less waste. If every man in America went to work and produced to his utmost, we would soon overcome the present-day industrial ills.

EDWARD B. FRITZ.



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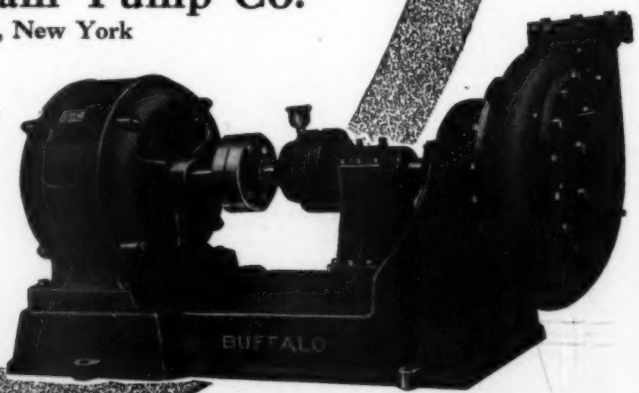

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EDITORIAL

ONE of the thoughts brought out by Mr. George P. Hambrecht in his very able address before the American Pulp and Paper Mill Superintendents' Association was that "We must be careful not to kill the creative spirit in labor or we will have labor feel that its only responsibility is to collect the pay envelope after the week's work is done."

Are you among the many executives who have endeavored to develop the creative spirit of your men by giving them an opportunity to realize the important relationship that their daily task bears to the finished product, and have instituted shop committees or some other means whereby they might be able to give expression to their views and criticisms, or are you one of the few old line executives who have nothing to learn and fear any criticism?

If you are in the second classification, you are laboring under an illusion and overlooking one of the most valuable assets in your business. The just criticism of your personnel is not a thing you ought to fear, but something that you ought to encourage, for it is only by criticism that constructive ideas can be made available to you for the further development of your organization. There is no criticism that could possibly be more valuable for this purpose than that which comes from the organization itself.

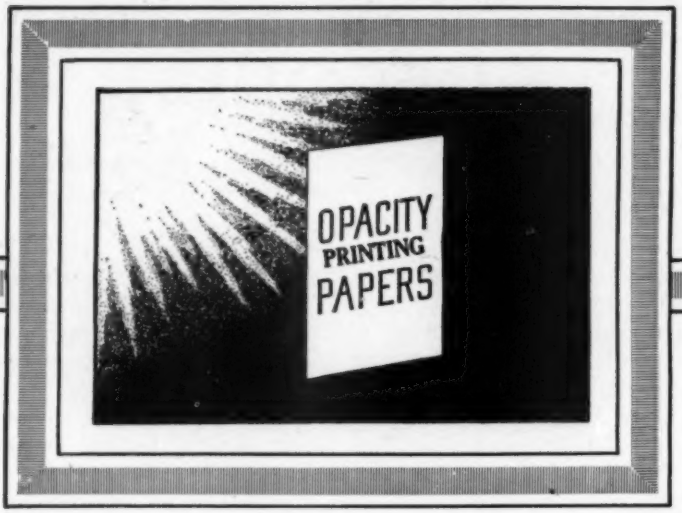
Without the constructive ideas brought out by criticism and developed by discussion, an organization, or enterprise of any description would be a failure, as the chief incentive to its further development would be lacking. It would then "go to seed," retrogress instead of progress, until finally it has ceased to function.

There is nothing that can stand still in this world—everything must move forward or backward; mankind and its works are no exception to this rule. In no period of history can you find that any institution has stood still, for just so soon as its progress ceased its retrogression began.

Life is motion; motion is activity; activity brings development, and development is progress. Inactivity means stagnation, retrogression and dissolution. It is for you to decide which path to follow, whether it will be the forward path that keeps you always abreast of the times and leads to success, or the path of retrogression where you will be lost in the shuffle.

Develop the creative instincts of the men that are working for you by placing some of the burden of responsibility upon their shoulders. Because that is a progressive idea. It is the step forward that you must take in order to keep abreast of the times. It will distribute the multitude of minor responsibilities onto a large number of shoulders that are longing for it, and thereby give you an opportunity to concentrate upon the larger, more important problems of your business without being harassed by the small petty details of operation. It will give the various difficulties that confront the manufacturing end of your business the publicity and discussion necessary to bring about measures for their eradication, and enable you to approach them with that clear understanding that comes from wise criticism and intelligent discussion.

The sum and substance of the whole matter is that by giving your organization an opportunity to develop its creative instincts, you are fulfilling a very important need that will redound to your benefit. Wherever this necessity has been supplied, it has proven of incalculable value in the development of the organization. Sooner or later it must be supplied to your own organization. Then why not SOONER.



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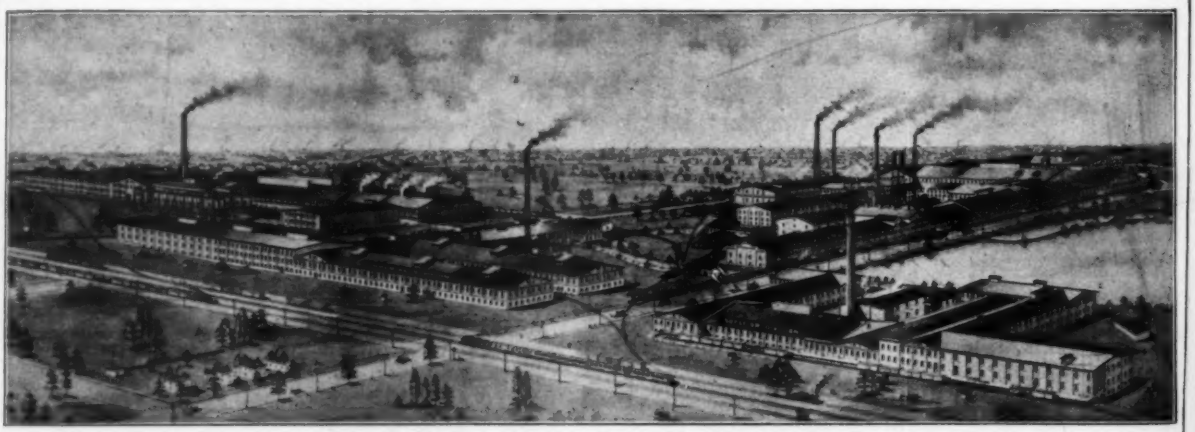

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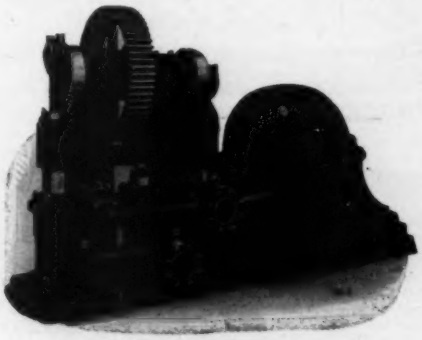

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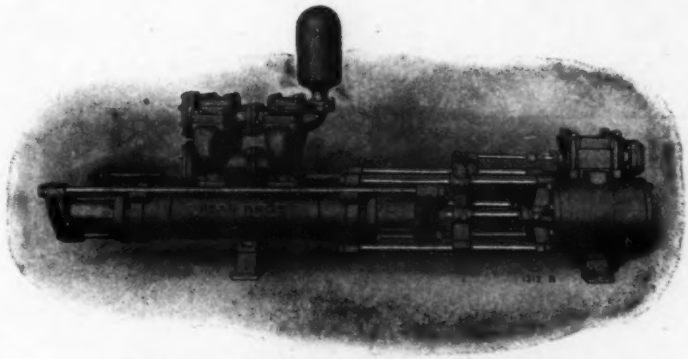

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Keep Your Feet on the Ground

NO matter how black things have looked in this country from the very day we first won our independence, we seem to have somehow or other a happy spirit of getting together on the right basis at the right time and winning out, irrespective of what the problems have been. And so today in the industrial unrest that we are going through now—in the crisis, if you please, that we are going through—stop and consider how we were all penned up for several years and then think of how all at once the lid went off, everything blew up, lid and all, and you will realize that it was only natural that we would have unrest; it was only natural that the fellow who was on the bottom a long time, when he got on the top, would try to do the things that he thought he would do when he was the under dog if he ever got on top. It is only natural that we have the pains and aches, but they are only growing pains and we are going to grow out of them all right.

I don't have any fear, and I don't think you have, that this country is ready yet to give an illustration of how to go to the devil. We are going to keep our feet on the ground. We are bound to win out.

PHIL GRAU.

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Rainbow Machine Hose is constructed to withstand the hard usage which hose receives in washing up around paper machines.

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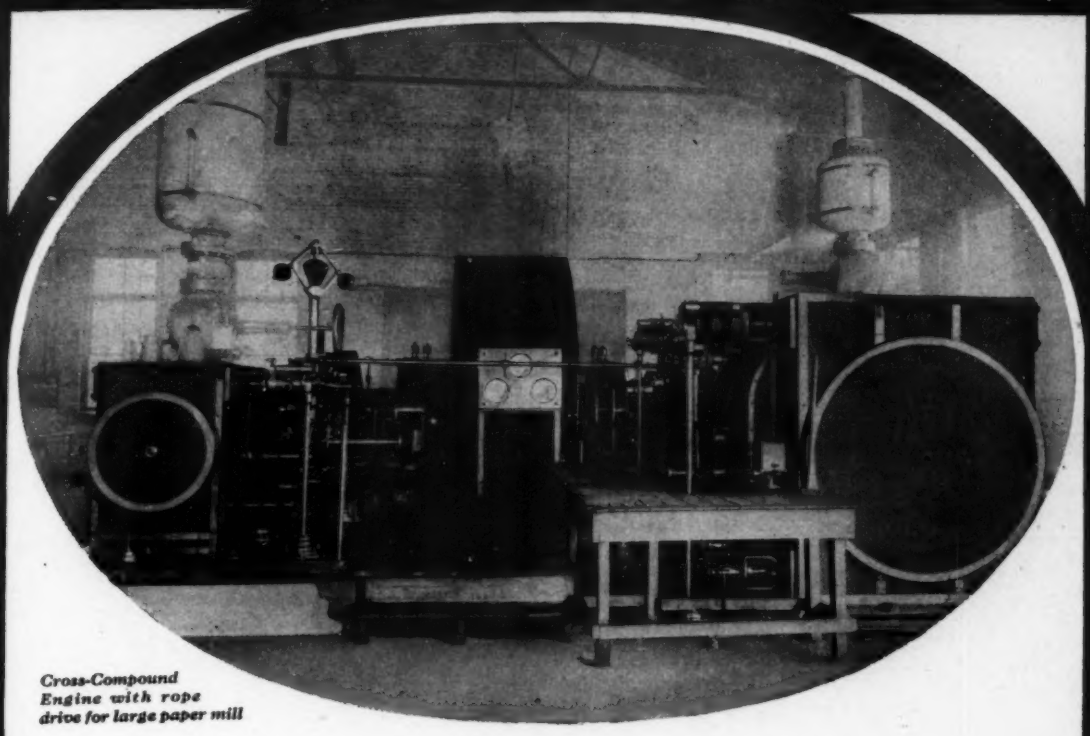

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Which Are You?

THERE are just two kinds of people on earth today—
Just two kinds of people, no more, I say.

Not the sinner and saint, for 'tis well understood
The good are half bad and the bad are half good.

Not the rich and the poor, for to count a man's wealth
You must first know the state of his conscience and health;

Not the humble and proud, for, in life's little span
Who puts on vain airs is not counted a man;

Not the happy and sad, for the swift flying years
Bring each man his laughter and each man his tears.

No! The two kinds of people on earth that I mean
Are the people who lift and the people who lean.

Wherever you go you will find the world's masses
Are always divided in just these two classes.

And, oddly enough, you will find, too, I ween,
There is only one lifter to twenty who lean.

In what class are you? Are you easing the load
Of overtaxed lifters who toil down the road?

Or are you a leaner, who lets others bear
Your portion of labor and worry and care?

—Anonymous.

THE PAPER INDUSTRY

"The Educational Magazine for the Paper Industry"

Volume I NOVEMBER, 1919 Number 8

Factors Affecting the Durability of Structural Wood and the Most Practical Methods of Preservation

By KURT C. BARTH

Part I—Physical Influences. The Fire Hazard of Creosoted Wood. Preservative Treatment of Timber for Industrial Structures and Paper Mills. Processes Applicable to Conditions of Average Consumers

IN the design of industrial as well as private buildings in which lumber is employed, the factor of decay and destructive activities of insects in some localities is ever present and should be given careful consideration by the architect. The conditions affecting the durability of wood prevalent in ordinary warehouse and other commercial construction, as also in the general type of workingmen's homes and the average suburban and rural dwellings, are naturally less favorable to the development of decay than are found in exterior timber structures and some types of manufacturing plants, but are, nevertheless, sufficiently active to cause a huge loss warranting utmost care in design, the selection of material, and employment of remedial measures.

The causes of decay are too well known to require exhaustive discussion,—suffice it to say that where air, moisture, and warmth are present, conditions are favorable for the development of fungous growths.

The characteristics of wood destroying organisms are aptly discussed by C. J. Humphrey, Pathologist, Forest Products Laboratory, U. S. Department of Agriculture, Madison, in the Journal of the Western Society of Engineers, from which (Vol. 22, pages 62-63) the following extracts are quoted: "Decay is due almost entirely to the growth of the wood-destroying fungi within the tissues of the wood. These fungi are plants just as much as are trees and herbs. They differ merely in their form, lack of green coloring matter and methods of nutrition. While green plants absorb their food supplies from the soil through their roots, fungi derive their nutriment from the substance of the wood. In the life cycle of a wood-destroying fungus there are two distinct stages: (1) The vegetative stage, consisting of thread-like, usually much branched, filaments, termed mycelium, which takes on definite form on the surface of the decaying timbers and serves for the production of spores and hence the propagation of the species. The mycelium is usually confined within the wood substance, the fine cotton-like filaments ramifying the tissues and filling the pores of the wood and the cells of the pith rays, as well as boring through the walls of the wood elements. It can roughly be compared to the root system of ordinary plants, for its function is the same, namely, that of an absorbing system. In order to render the constituents of the wood available for food they must be reduced to simpler organic compounds which can

be absorbed readily through the walls of the mycelial filaments. This is accomplished by the secretion of organized ferments which have the capacity of acting chemically upon the wood and splitting up the complex compounds into their simpler components."

It is, therefore, merely necessary to destroy the nutritious value of wood in order to inhibit the development of fungi, virtually causing their starvation or

Fig. No. 1. Badly decayed Southern Pine timber

destroying them by poisoning the food and thus preventing or retarding decay. This is most readily accomplished by the treatment of the wood with a toxic agent or preservative, such as coal-tar creosote oil.

Protection Against Termites

Decay is not the only enemy which attacks the durability of structural wood. In the territory south of the Ohio River great destruction and loss is occasioned by the activities of white ants (Termites). No type of building in which wood is used that is in contact with or can be reached from the ground is proof against the ravages of these insects. T. E.

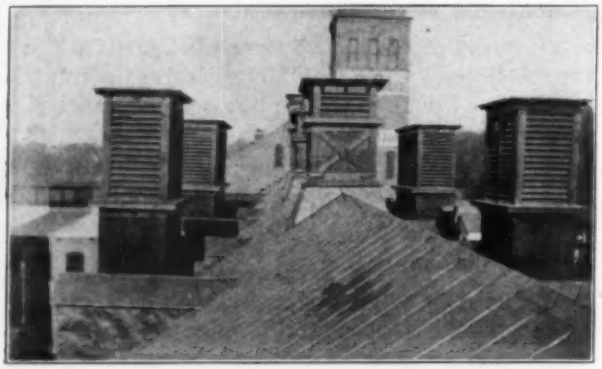

Fig. No. 2. Paper mill machine room ventilators, brush treated, in good condition after 10 years' service

Snyder, in Bulletin No. 759, Bureau of Entomology, U. S. Department of Agriculture, treats this subject in detail, and states: "Beams such as joists, studding, stringers and other foundation timbers in the basement or cellar, even though entirely enclosed or embedded in concrete, are but partially protected from termites. In the setting of the structure or in weathering, concrete is almost sure to crack and allow moisture and insects to enter. Furthermore, beams and joists put down in moist concrete decay rapidly and become exceptionally good breeding places for these insects; from such beams white ants carry their burrows up through the timbers to the first, second and even third floors. Any wood construction in contact with the ground is especially liable to attack by white ants." "* * * timber impregnated with coal-tar creosote should be used. Untreated beams should never be laid on the earth nor embedded in moist concrete, since they will rot, even if they do not become infested."

The Fire Hazard of Creosoted Timber

This has been a bugaboo which is very frequently advanced when the advisability of employing creosoted wood, no matter by what process it is to be treated, is discussed. The impression seems to be rather popular among engineers and architects who have perhaps had little opportunity to investigate the subject that because creosote oil is a distillate of coal-tar, lumber to which it has been applied is

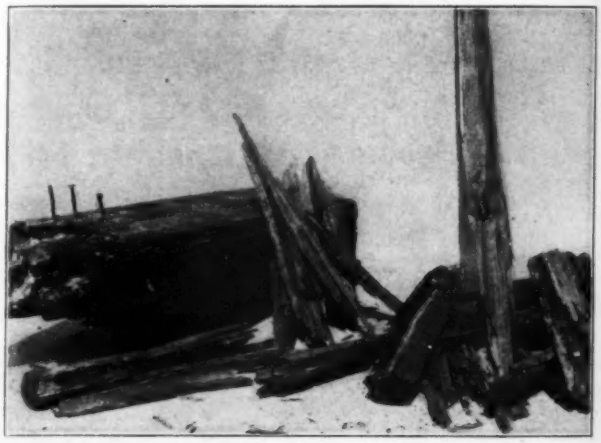

Fig. No. 3. Decayed Southern Pine stringer removed from roof of paper mill machine room after less than 9 years' service

highly inflammable. Wood freshly treated with heavy injections of creosote oil is somewhat more combustible than untreated wood, but when dry it is to a certain degree more resistant to ignition. Partially decayed timber is decidedly the greater fire hazard, thus preservative treatment is a retardant measure.

To obtain reliable data on this point extensive investigations and experiments have been conducted, a discussion of which was published by Dr. Herman von Schrenk in the quarterly Bulletin of the National Fire Protection Association of April, 1918. The following quotations have been abstracted from his

article, "The Creosoting Industry with Relation to the Fire Hazard," pages 399-413, inclusive:

"A study of the figures indicates very clearly that the creosoted pieces resisted ignition two or three times as long as did any of the untreated pieces." "The conclusions drawn from these preliminary determinations were that creosoted timber after drying about six months is less inflammable than similar timber in an untreated condition." "The conclusions just referred to confirm the results of practical ex-

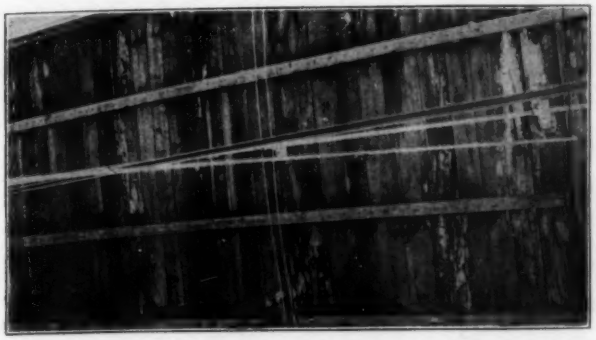

Fig. No. 4. Sections of a decayed roof of a textile mill, after a brief period of service

perience during the last 20 years or more." "In order to test the relative resistance of the creosoted posts to this kind of action, the test sections just referred to were constructed." "* * * two posts, one of the usual cedar post and the other a sycamore, which is given as typical of all the creosoted posts butt treated. These posts have been in position for about 13 years, and all of the creosoted posts are in as perfect condition as when they were first placed, while many of the untreated posts have burned off." "The results obtained with the creosoted fence posts have furthermore been confirmed by the history of creosoted telephone and telegraph pole lines."

"Another set of interesting data was recently obtained with reference to the inflammability of creosoted yellow pine wooden pavements. In 1914, pier 36 of the Philadelphia & Reading Railroad was destroyed by fire. The fire was so hot that a large portion of the structural steel was fused and the whole pier shed was destroyed and the greater portion of it thrown down on the wood block floor. After the removal of the debris, it was found that the wood blocks which had been directly subjected to flames were only charred from 1/8 to 1/4 inch deep, but where the fused structural steel had come into direct contact with the blocks, they were charred from 3/4 to an inch deep. In the reconstruction of the pier, it was found that it would only be necessary to remove the charred surface of the blocks, and this was done by scraping, but at points where deep scars had been made by the contact with the steel the blocks were removed, turned upside down and relaid. It should be stated that all this wood block paving had been laid on a concrete base. Experience elsewhere has shown that where creosoted wood block paving is laid in this manner, the fire hazard is practically negligible."

"Summarizing the foregoing, it appears that creosoted timbers, when freshly treated, are highly inflammable, due no doubt to the giving off of gases of a highly inflammable nature. As the creosoted timber ages, there is a marked reduction in inflammability, until after five or six months it will have the same degree of inflammability as untreated timber, and from then on becomes less inflammable. The reason for this is that the high flash point of the oil usually used requires a very high initial temperature to set the same on fire. This is particularly true of the oils used at the present time, the flash point of which is about 280° F., whereas the oils used some years ago had a flash point of about 210° F. As the oil evaporates, the compounds left in the outer layers on the outer surface of the wood require an increasing temperature to set them on fire. As was well stated by Mr. Rollins, 'just as this coating increases, the inflammability of the timber decreases, and finally when all vaporization has ceased, the timber is in a measure fireproofed by the coating. It is, however, possible to ignite the timber even after this coating is formed, but it does not ignite as easily as the same kind of timber untreated and in the same state of dryness.' "

The foregoing refers to timber which has been impregnated with commercial creosote oil by the pressure process, and although the findings are equally applicable to wood treated by nonpressure processes, particularly the open tank process, there is probably a slight difference in favor of refined creosote which should be employed in the latter treatments. As will be noted, the degree of inflammability that admit-

Fig. No. 5. Wooden roof decks of paper mill machine rooms preserved from decay by surface treatments

tedly exists in the case of timber freshly impregnated with commercial creosote is charged partially to the presence of low boiling fractions which volatilize during the period of seasoning, and thereafter the combustibility of the timber is less than when untreated. Thus it follows that the fire hazard would be even

more negligible when wood has been impregnated with refined creosote oil because of the removal of the low boiling fractions by refinement and distillation, resulting in a high flash point, and a practically non-volatile oil. Timber so treated can be employed with perfect safety after seasoning for from 24 hours to possibly 10 days, in extreme cases, depending upon weather conditions.

Preservative Treatment of Timber for Industrial Structures

Preservative treatment of timber has been practiced in the construction and repair of certain types of industrial buildings for a number of years, but also in this field a further extension of this economy is practical. Particularly advantageous results have been obtained from the use of treated lumber in the roofs over machine rooms of paper mills. There, as well as in the weave sheds of textile mills, excessive artificial humidity causes conditions highly conducive to the development of wood destroying fungi and consequently rapid decay of the wood. In paper mills the average life of the best grades of untreated lumber employed in roof decks of machine rooms is seldom more than nine years (Figure 3), and in many instances but four years of service were realized. The writer investigated several cases where roofs of treated lumber were in excellent state of preservation after seven, eight and nine years of service.

A little over a year ago the attention of engineers and experts was attracted to the textile mills of New England where decay had destroyed numerous wooden roofs (Figure 4) after comparatively short periods of service. Exhaustive investigations resulted in the general recommendations that the lumber should be given effective preservative treatment, which were accepted and acted upon by several of the mills. In discussing this matter F. J. Hoxie, a well known Boston insurance engineer, stated: "We are concerned only in assuring ourselves that our members employ safe construction and do not use material which may result in their plants becoming dangerous fire risks. *No one can question that a mill with a rotten roof is a bad risk.* Personally, I believe and my associates believe, I think, that a heavy plank roof is the ideal covering for a cotton weave shed, provided that it won't rot" (American Lumberman, Jan. 6, 1917). Again Mr. Hoxie in a letter to the editor of Wood Preserving (Wood Preserving, issue of July-September, 1917), referred to this subject as follows: "It seems to me that a phase of the preservation of mill timbers which is worthy of the consideration of wood preservers at the present time, is insulation for mill roofs, whether wood or concrete. In many cases where highly humidified air is present, such as cotton weaving mills, paper mills and finishing works, this insulation is of the utmost importance. I believe that it is possible to make use of poor qualities of timber for this purpose and particularly sap-wood thoroughly creosoted. This can be used for concrete forms temporarily, and later permanently installed on top of a concrete roof for insulation. The same type of material can be similarly used for insulating wood roofs generally where the insulation is of importance. The strength is secondary as it will be advisable to use considerably more planking than strength would require to obtain the required heat insulation. This treated plank will be placed on top of the finished roof with three or four thicknesses of tarred paper, tar under it and the tar and gravel roof on top, so that looks, painting or dripping are not important.

Dr. Herman von Schrenk, a nationally known authority on the subject of wood utilization, discussed this matter in the Lumber World Review (May 25, 1917), and his remarks relative to the need for preserving the roof planking are very interesting and valuable. He is quoted as follows: "The very severe humidity conditions, particularly in the weave sheds, indicate that the use of untreated yellow pine will in many cases probably be impracticable, no matter how high the grade; in other words, untreated pine will doubtless fail by decay, due to the extraordinary conditions, in spite of the greatest care. This naturally leads to a discussion as to the possibility of artificially preserving the timbers, particularly the roof planking. There are several possibilities as to the chemicals to be used. One naturally thinks first of all of creosote. An effective way of using creosoted planking would consist in covering the creosoted timber with sheathing, as there would be no possibility of the creosoted planking decaying, and the sheathing could be painted as often as necessary. One advantage of using some form of treated lumber will undoubtedly lie in the possibility of buying lower grades of yellow pine and treating the same. The lower grade lumber can be bought for much less than the "select structural" grade, and in its treated condition would serve every bit as well and possibly better than the untreated high-grade lumber in those rooms where the high humidity conditions make for extremely rapid decay."

Further interesting literature on this subject was contributed by F. P. Sheldon & Sons, the well-known mill architects and engineers of Providence, R. I., who instituted extensive experiments to determine the condensation under various types of roofs and the relative insulating value of various materials. The results with curves were discussed in the Engineering News Record of July 5, 1917, and in conclusion Mr. Sheldon is quoted as follows: "The successful solution of the problem of the design of wood roofs resolves itself into two requirements: The roof should be made thick enough, according to the accompanying curves, to prevent the occurrence of condensation upon its under surface. Secondly, it

should be protected against decay by proper preservative treatment."

The reference to creosoted timber in the foregoing quotations, and the recommendations of Mr. Hoxie and Dr. von Schrenk are interpreted by the writer as referring exclusively to lumber impregnated by the standard pressure processes, i. e., injection of commercial coal-tar creosote oil under artificial pressure in large steel cylinders or retorts. Undoubtedly this method of treatment is the most efficient and will secure the best penetration of the preservative, and where mechanical abrasion is to be expected, or when species of wood resistant to injection of creosote oil are to be treated, the pressure process should by all means be chosen. That would require the architect or engineer to anticipate his needs sufficiently to provide for treatment of the lumber before delivery to the job, either by purchase from commercial creosoting plants having lumber mill connections, or by having the lumber stopped at a treating plant and creosoted en route. If the material were obtained locally it would have to be shipped to the nearest creosoting plant for treatment which would, of course, be impractical excepting in rare instances where there would be but a short haul. In numerous cases the expense, trouble and delay of obtaining lumber treated by the pressure process at commercial plants, particularly when these are located at considerable distances, is not warranted nor practical under the usual conditions encountered in repair and new construction work at the average industrial plants.

Non-Pressure Process Applicable to Conditions of the Average Consumer

The economy of wood preservation would be beyond the means of the average consumer and such not conveniently situated were it not for the development of non-pressure methods of preservative treatment, which, though admittedly not generally as efficient as the pressure processes, are nevertheless very effective in retarding decay, even under the most severe conditions.

Briefly, the non-pressure processes are divided as follows: (a) The open tank process, impregnation of timber to refusal in open tanks or vats, under atmospheric pressure only, by complete immersion for varying periods in alternate hot and cold baths of refined coal-tar creosote oil; (b) brush and dipping methods, i. e., surface treatments of timber with refined coal-tar creosote oil by spraying or application of two paint coats, or short immersions in the preservative.

Fig. No. 6. Open tank process creosoting plant used for treating lumber for new roof deck for machine room, installed at the Bryant Paper Co., Kalamazoo

In nearly all cases where treated lumber has been used in paper mills during the past ten years or so, surface treatments only were employed, chiefly be-

(*Continued on page 619*)

Export Packing

By JAMES A. ANDERSON

IF your house burns down, it is in the morning paper. If it does not burn down, it is not mentioned. It is the unusual that is news. There were 100 sheep, of which exactly one went astray, and that one sheep causes more commotion and is more talked about than all the 90 and 9 that went not astray.

This is an enormous manufacturing country. Most of its manufactures are packed for shipment. Many of them go abroad. They reach the customer in good order, and the customer says not a word about them. But a case reaches the customer in bad order; does he say anything? He certainly does.

Whatever the proportion of bad packing may be to good packing, there should be less bad packing—there ought to be none at all. "It is the one fly in the ointment that causes it all to stink." In fact American packing has got a bad name abroad. This reputation is partly a hang-over from modes of packing which have long been disused by American shippers, and is partly, perhaps, fostered by interests opposed to American export trade. But, as we all know, it is not enough to give a customer good goods, he must know that he has them; it is not enough to do most of our export packing right, but the customer must feel sure that it will be right. And the only way he can be sure is for us always to do it right.

The shipping room is as important a part of a plant as the purchasing department or the mill itself, and has just as much influence on the reputation of the concern, on the amount of business it does, and on its profits. The shipping clerk should have as clear a knowledge of his duties and the reasons for doing things as the head of any branch of the work. He should be given proper instructions, proper materials and facilities, and held to results. One reason, no doubt, that a shipping clerk is not quite careful enough in packing is that he does not realize what happens to a case after it leaves him.

Say it is an L. C. L. shipment of cased paper for Santiago, Chile. What happens to it? He sees it onto the dray, it is dumped on to the railroad freight platform, bumped into a freight car. A few days later it is dropped out of the freight car, with the aid of case-hooks, on to a platform in the classification yard. It is hooked and boosted into another car, and at the railroad terminus dropped on to a platform again. Then it is handled on to a truck, and off again at the steamship pier, loaded into a sling or a big net of cables, along with other goods, pressing and chafing and bumping against each other, and the crane lets it down into the ship's hold. Husky stevedores with ready case-hooks stow it into place, and the voyage begins.

There is a bit of rough weather. The stowing was done carefully, but the inside of a ship is not just the size and shape of the goods stowed in it. There is chafing and some pounding. There is a good deal of very penetrating damp salt air.

After three weeks at sea, the ship reaches Valparaiso. As in many other important harbors, a ship cannot land, but has to unload by means of "lighters," small boats that can go in shallow water. The crane reaches down into the hold with a big cable net. The sailors dump into it the various packages, cases, bales, rolls—what not—marked "Valparaiso." The net is drawn together; perhaps a few things are spilled out and drop sharply to the deck as the big crane swings the net out and over the little lighter waiting alongside. The ship is rolling a bit in the open roads. The lighter is bobbing up and down on the waves. Ready!—ready!—Go! and the net is released. Last time it hit just right, but this time the ship lurched, and the freight comes down with a sharp blow against the floor of the lighter, which happens to be on the up trip.

That case still has to be dumped on to the wharf, trucked to the railroad station, loaded on a car for Santiago, and unloaded there and trucked to the customer's plant.

It takes good packing to stand all that. That most American packing does stand it is a thing for us to be proud of, but that some American packing does not stand it is a thing which receives a great deal more publicity. It is like your house burning down, and it does just as much damage, for it is surprising how invariably the case which is damaged seems to be the critical case on which everything else depends.

If that case for Valparaiso had broken, what would have been the customer's position? It would be that he had paid a price per 100 pounds for the paper, plus $4 or $5 per 100 pounds for freight and insurance, not counting port charges, duties, and transportation in Chile. He would have bought the paper to print, say, a directory in which he had invested several thousands of dollars for compilation and typesetting, and for which he had secured advertising based on publication at a given time, and he would have only—a claim.

Fortunately, many American houses are now using good packing methods, but if so much as one does bad packing it gives them all a bad name.

Now, how ought paper to be packed for export?

(*Continued on page 606*)

Conservation of Heat Losses in Paper Drying

By COLE STICKLE

(This Paper Presented at the Meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents' Association, at Kalamazoo, October 20, 1919)

GENTLEMEN: I feel that a great favor has been extended me by the officers of this association in inviting me to make a few remarks at this time. As a manufacturer of equipment that is used quite extensively in paper mills, I appreciate the opportunity of making some remarks along these lines, and I will try not to impose upon you by extolling the merits of this particular equipment.

The subject which I have been asked to talk about is one in which I am deeply interested, that of "Drying Paper" and the "Conservation of Heat Losses in the Mills." These subjects require much more time in arriving at a fair conclusion than can be given in this brief talk. However, I will try to cover the more important points of drying paper.

The first and one of the more important points is to remove the air and condensation from the dryers as fast as it accumulates and not allow steam to escape. It is very essential that a uniform temperature be maintained in the dryers in producing a uniformly dried sheet. The question of how to remove this water as fast as it accumulates brings the subject to a point where many men differ.

According to the laws of gravity, water will not run uphill.

I will make the application first to the syphon dryer, showing the different installation of steam traps in common practice. We will take a machine having thirty dryers 48 inches in diameter with an installation of one large steam trap to handle the condensation from all the dryers making a sheet of news print running at approximately 600 feet per minute. We will consider that the steam trap is amply large to handle the condensation. We undertake to make a test on this machine by weighing the water. We find at intervals that there is a large volume returned and at another period that there is but a small amount returning. This is conclusive proof that the water has accumulated in the dryers and while this is taking place there is a change in temperature of the returning water. Is not this quite conclusive proof that there was a drop in temperature in the dryers? The only sane explanation for the water not coming back as fast as it accumulated is that there is a steam trap at the end of the machine with thirty ¾-inch or 1-inch syphon pipes discharging into this line, and the pressure is found to be the same in the return line as it is in the dryers. Here we are up against a balanced condition and cannot very well expect water to run uphill without some force or some difference in pressure between the discharge line and the dryers. To overcome its weight it is absolutely impossible to get this with one steam trap on the machine. It is equally impossible to get the desired results with even three traps on three separate sections, due to the fact that you have the same balanced condition, and the only way the water can get out of the dryer is to fill sufficient to start the syphon, then all the water will be drawn out of the dryer.

With the same conditions existing I wish to speak of the bucket or dipper in the dryers, with one, two, or three steam traps handling the water on a fast machine running approximately 600 feet per minute. Centrifugal force will prevent the water from discharging as fast as it accumulates. This can be easily demonstrated by taking a small bucket of water in your hand and swinging your arm at the same speed of the dryer. You will see that no water escapes from it. The only way the water does get out of the dryer is when a sufficient amount has accumulated so that its weight overcomes the centrifugal force.

The uneven discharge of water from the dryers with the consequent change of temperature necessitates the turning on and shutting off of steam. This means an unevenly dried sheet. It also causes a change of moisture in the drying felt which is constantly contracting and expanding. There is nothing that shortens the life of a dryer felt more than this condition. When these changes of temperature occur it changes the draw of the sheet. When it is slightly damp the sheet is longer and running loose and the dryer felt is shorter. This reverse action will cockle or wrinkle the sheet.

We will consider the application of the individual trap to each dryer with a slight lead in the valve under the same conditions of 10 pounds steam pressure. As soon as the water covers the end of the syphon pipe it will be forced over into the trap; the trap opens, discharges and closes. This prevents any steam going to waste. It is fair to assume that water cannot accumulate in the dryer provided the trap is a good one and works. This is due entirely to the differential between 10 pounds pressure in the dryer and atmosphere on the discharge line. This arrangement figures to work, but will not work in-

definitely without some attention. There are conditions on many machines on light weight paper that are drying at atmosphere and below with sometimes as much as five inches of vacuum on the steam header of the machine. You could not expect to remove the water from these dryers in any other way than by maintaining a vacuum on the discharge line that would exceed the vacuum in the dryer sufficient to cause the water to raise in the syphon and flow into the vacuum pump. The ideal conditions, as I see them, in producing a uniformly dried sheet of paper with a sufficient amount of moisture in it to get the desired finish, can be obtained only in one way—by having a perfect drainage system on the dryers and an automatic control of steam that will hold the dryers at the required temperature to dry the sheet evenly. This is not a theory but a demonstrated fact.

It is not uncommon to go into a mill and see individual traps on each unit of radiation of the heating system connected to a vacuum pump, and find the paper machines running with one, two, or three traps, as the case may be. I would like to know if it is not more difficult to get the water out of a paper machine dryer than out of a heating unit. The heating unit will flow by gravity to the trap, but the water in the paper machine dryer has to be raised two feet to get out of the dryer. I would think this was a simple proposition to decide. Tell me why any engineer should specify individual traps and a vacuum system for heating the plant, and then say he did not believe in individual traps on machines. This is equal to admitting that there is no trap on the market that can be used in the same manner on the paper machine as on the heating system.

In the few remarks that I will make on the conservation of heat losses in the manufacture of paper, I wish to confine them more particularly to the machine room. We will assume that the paper machine is properly drained and controlled and no material losses are perceptible. The ordinary paper machine on different classes of paper requires from 300 to 600 H. P. to dry the sheet. This depends on the width and speed of the machine. The condensation discharging from this machine is available for conditioning the air in the machine room. This is being successfully done on several paper machines now in operation. It is done by connecting the discharge from the traps on the paper machine to hot blast coils with the proper arrangement of equipment and the necessary vacuum traps and pump. You have arranged a condensing apparatus that will operate at a partial vacuum. The greater portion of the condensation from the dryers will flash into steam and furnish sufficient hot air to perfectly ventilate the machine room without any material cost of fuel.

Some of you may take exceptions to this statement. If you do, I will bring your attention to the multiple effect evaporator that you are familiar with in the process of the manufacture of pulp. Steam is admitted to the first effect and the other units are operated by removing the atmosphere, causing the last effect to boil freely at 100 degrees Fahrenheit. Now apply this to your paper machine operating at 10 pounds steam pressure. If properly drained the temperature of the discharge will be approximately 239 degrees. The cold air coming in contact with the coils will produce a vacuum. With the proper traps and pump you can maintain a vacuum in the coils. In this way you make a decided saving in heat units that would otherwise go to waste. This is good practice and should be adopted. There is a great saving to be made here with less expenditure than at any other point in the machine room.

(*Continued from page 604*)

That depends partly on the kind of paper it is, and very largely on where it is to go. But for most papers, and for most places, the right way to pack paper for export is in a case of good sound boards, matched, lined with real waterproof paper, and strapped with strong iron bands. It ought not to have more than five hundred pounds of paper in it, net. The nails should be resin or cement coated so that they won't pull out, and there are various details as to the construction of the case—for some are much stronger than others—and the width of iron strapping, etc., which experienced exporters are very glad to tell the mills. Strength is the chief consideration, but not the only one. Ocean freight rates are very high, and are usually based on volume rather than on weight. One construction of a box will save 8% space as against another, without any loss of strength. For some markets the duties are assessed on the gross weight, and the utmost strength must be combined with the utmost lightness.

The paper must be full size and full count, thoroughly protected against damp, so that sea-water itself cannot seep through, the case must be strong enough to withstand much more severe usage than domestic freight ever gets, and to stand repeated handlings—it is apt to get seven or eight before reaching destination.

It is not hard to pack for export. It is mostly in knowing how and in being willing to take the care. There are concerns in this country which have been exporting paper for over thirty years, and this would be impossible if their goods did not usually get to their destination in good shape. They know just what the requirements are for each different part of the world, and for each different kind of paper. They have a mutual interest in helping the American manufacturer in packing his goods so that they will reach the customer. Ask them.

Pack right, mark right, please the customer, and you make a profit.

Pack wrong, mark wrong, give a handle to the enemies of America to use against us.

The Rosin and Rosin Size Industry

By C. W. RIESER, Chemist
Western Paper Makers Chemical Co.

This paper was presented at the meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents' Association, at Kalamazoo, on Oct. 20, 1919

YOU have probably already heard a great deal on the subject of rosin sizing. There are almost as many theories on the subject of rosin sizing as there are men to promulgate them. However, this evening we will try to present some new phases of the rosin and rosin size industry, and stay as much as possible with facts as found out in practice.

As rosin size depends a great deal upon the original rosin from which it is made, it may be well to explain briefly the manufacture of rosin.

The production of rosin is confined entirely to the longleaf yellow pine. This tree is found in Florida, Louisiana, Georgia, Alabama, Mississippi, South Carolina, and parts of North Carolina and Texas.

These forest areas are divided into turpentine farms, which in turn are divided into drifts of ten thousand five hundred trees each. The extra five hundred are simply to make up any miscount and to insure a full ten thousand. The trees are then scarified; that is, a slab cut from the surface of the tree about eight inches wide and a foot high. This cut is V-shaped at the bottom, with two strips of metal to form the V. These strips of metal protrude out from the tree, forming a sort of run for the gum to follow. It then drops from the lowest point of the V to a cup.

Upon the scarifying or tapping depends the life of the tree. If the tree is cut deep, so much of the gum will exude that it will die. On the other hand, if the cut is made shallow the tree will live for several years afterwards. When a forest of pine is to be cut for lumber purposes the cuts are made deep, thus obtaining the maximum amount of gum and doing the timber no harm.

The first tapping of trees is called the virgin box. From this tapping is obtained the pale rosins, such as W. W. W. G., etc. From the second or yearling box and the third or pulling box are obtained the darker grades. The reason for this difference in color does not seem to be quite clear. If a forest is tapped every year the trees will almost invariably die at the end of the third year. If the trees are tapped only every other year the process can go on almost indefinitely.

The process called dipping consists of removing the cups from the trees at intervals and emptying them into barrels placed at convenient places. When the barrels are full they are taken to the still.

In the old way of refining rosin these stills are of copper and hold from five to ten barrels of gum at a time. The heat is supplied by direct fire underneath the still. This has largely been abandoned, as the rosin becomes disintegrated by the direct heat giving large quantities of impurities to the rosin, which, while they are not always noticeable in the rosin itself, cause considerable waste when used for size. It also in some cases lowers the grade and fills the rosin full of small charred particles.

On the other hand, recent installations such as just completed by the Western Paper Makers Chemical Co., at Pensacola, Florida, are much larger, holding seventy-five barrels of gum at a charge and heated by superheated steam. Instead of filtering through wads of cotton, as is being done in the old process, the original gum is thinned out with excess turpentine and the diluted solution pumped through a water bath. The wood rises to the surface, the sand and heavier particles sink to the bottom, and the gum is tapped out under the surface. From here it goes to the stills, the turpentine distilled off and the rosin tapped out and barreled. Thus it can be seen that a very good, clean grade of rosin is produced. No charring or disintegration takes place.

The rosin is then barreled and weighed. The Government inspector does the grading according to a special set of cubes such as I have here. These grades are B. D. E. F. G. H. K. M. W. G. and W. W. Rosin is sold on a basis of 280 lbs. or one-eighth of the old English ton gross weight. The tare consisting of staves, heads, hoops, moisture, etc., amounts to about thirty per cent.

There is another grade of rosin made by extracting old stumps and other pine wood with naphtha and afterwards distilling off the solvent. This method gives a rosin which contains pitch tannin and all other substances soluble in naphtha. On this account it is unfit for paper making purposes. It gives very poor sizing qualities and affects the color very adversely.

From this it can very readily be seen that rosin size depends very materially upon the rosin from which it is produced. The cleanliness, freedom from pitch, volatile matter and substances which adversely affect the sizing qualities, and the color of the paper, of the size are very largely governed by the original rosin.

The effectiveness of rosin size is largely determined by its solubility. This solubility in turn is very visibly affected by the fineness of the particles.

Boiling in large digesters where a violent circulation and agitation is constantly taking place produces a product which is very finely divided and very soluble.

When everything is taken into consideration there is really no more reason for paper mills to make their own rosin size than there is for these same mills to enter into the manufacture of their own alum, vitriol or soda ash. In the first place attention has been called to the facts that the sizing qualities of size depend largely upon the solubility and the fineness, especially of the free rosin particles. It is impossible to obtain these same results in a small way. In this same connection rosin is a material that can vary to a large extent and consequently for this reason no two cars will be alike. Very often there is a wide variation in the same car.

On the other hand, to most of us the monetary saving is the most convincing. When everything is taken into consideration a good prepared size can be bought cheaper than any mill can produce it from rosin on a small scale.

Now, as to the constituents of the size itself. By using the proper amount of soda a size can be made which contains only a rosin soap and has neither an excess of rosin nor an excess of soda. This is called a neutral size. By reducing the amount of soda ash a size is made which contains a certain amount of rosin soap and the balance of the rosin dissolved in this soap and present as free rosin that is not combined with soda. The percentage of the rosin that can safely be carried by this soap is about thirty-five per cent of the total amount of rosin present. If more is present there is danger of filling up machine clothing and size spots.

It is difficult to say just what percentage of free rosin it is safe to use in a given mill until all the conditions are taken into account and analyzed. Such things as hard water, residual, acid liquors and lime in the raw stock, the use of waste water from the machine to furnish beaters all militate against too high free rosin. For certain grades of paper such as very light weight bond and other similar grades it is generally thought best to use as high free rosin as other conditions will allow.

The same must be said of alum. Hard water, residual, lime in the pulp all require alum for neutralization. In fact, these factors require more alum in most cases than the size. The argument of economy in alum is often advanced for high free rosin sizes. Theoretically this is true, but for all practical purposes there is very little if any difference. For a mill using twenty-five pounds of seventy per cent size per beater it would make a difference in the soda ash content of a little over one pound, which in most cases would never be found. Enough alum should always be used to turn blue litmus paper distinctly red.

Foaming on the machine is caused by insufficient alum in the beaters, residual acid liquors in unbleached sulphite or in water, or if return waters are used to furnish beaters too much alum will cause foaming. Some colors will often cause foam. There are a great many antifroth compounds on the market. Some of these, such as kerosene, are insoluble in water. These, especially kerosene, are very harmful for the size and tend to soften the sheet. The best antifroth compounds are water soluble. These do the sizing no harm, and, while the initial expense is greater, the final cost is less.

There are two methods of using size—direct to the beater and emulsifying. In a great many cases it is just as good to add the size direct to the beater. In cases, however, where very high grades of paper are made it is generally thought best to emulsify before adding to the beaters. This can be done in a number of ways. The size paste should in all cases be hot before diluting. A tank equipped with steam coils is suitable for this. From this tank it can be run into another tank partly filled with hot water and equipped with an agitator. The mixture should then be stirred until all of the size is dissolved. The tank is then filled to the desired mark with cold water and well stirred. The size can also be run from the melting tank through injector systems and emulsified directly. This is the most convenient, as no power is necessary and the tanks can be of any desired shape. It also gives a very fine emulsion. In handling size, whether in the form of a paste or an emulsion, care must be taken that no steam can come into contact with it, as this will separate rosin and cause trouble not only in the finished paper, but also in the machine clothing.

The Value of Waste Paper Stock in the Manufacture of New Book Papers

By EDWARD T. A. COUGHLIN, B.S., CH., E.

Open Tank Cooking Process for Old Papers

THIS method of cooking old waste papers is by far the most popular and enjoys quite an extensive use and application in a number of the older mills. It receives its name "open tank" from the fact that the cooking tank is not covered during the cooking of the papers. Mention has already been made of this process in the Introduction, giving the details of the process as first patented by Mr. Ryan. However, many mills have their own special details such as strength of liquor, time for cooking, kind of alkali used and the temperature of liquor for cooking, which differ very materially from the details given in the Ryan process. These differences have come about from many years of experience, and by degrees the mills have reached the point where they have sound data for the proper cooking of old waste papers.

Description of the Cooking Tank

The cooking tank, or "bleach tub," as it is usually termed in the mill, is a stationary cylindrical tank, built of $\frac{3}{16}$" boiler iron. It is ten feet deep, ten feet in diameter at the bottom and ten feet one inch in diameter at the top. The plates are riveted so that all the projections are on the outside, making the inside as smooth as possible. The tank is provided with a false bottom made in eight sections. The false bottom is made of $\frac{3}{16}$" boiler plate, and to enable the cooking liquor to filter through to the real bottom of the tank $\frac{3}{8}$" holes are punched through this false plate. These holes are three inches apart from each other. This false bottom rests on a cast iron spider support which has six or eight arms. The spider is designed to support the false bottom 8" to 10" away from the bottom of the outside tank. This space between the two bottoms serves to provide a large volume of liquor which is projected up the central pipe by a steam injector when the cooking is in process.

The arms of the spider are riveted or fastened to an 8" central pipe, about nine feet long. The top of this pipe is equipped with a baffle plate about ten inches in diameter, with the under side slightly concaved and designed so that the liquor is sprayed out and downwards, covering the entire circumference of the tank. Near the top is also a large "U" shaped hook, which is allowed to swing downwards when not in use, for hooking onto the hoisting hook. The accompanying cuts will give the intimate details of the tank and the piping arrangement.

Furnishing of the Papers

The papers after being thoroughly dusted are discharged on to a conveyor belt which carries them to another belt on the floor above the cooking room.

Papers after being cooked and raised from the cooking tank by the hoisting mechanism. The papers are now ready to be "forked" off into the storage cars

This belt in turn brings the papers to chutes. These chutes may be arranged to deliver the papers directly into the tanks, or the papers may fall on to tables and are then thrown into the tank in armfuls by two men. This latter method may at first appear to in-

sprayed out and downwards in a full circle across the surface of the liquor. This spraying is an intermittent process, only occurring when the pressure of the steam under the column of liquor in the central pipe overcomes the weight of this volume of liquor and projects it upward against the baffle plate, continuing for such time until this excess pressure is diminished. The liquor then filters thru the papers, or runs down the sides of the pipe or the tank, re-

The old paper shredding machine in operation

turns to the bottom and forms a new and cooler volume of liquor for the steam pressure to work against. This spraying action should be regulated so that it occurs about 4 to 6 times a minute while the papers are being cooked. While the papers are being furnished to the tanks it is evident that this spraying must occur with greater rapidity, and so it is increased to about 10 to 15 times a minute. For this reason some mills are decidedly against the continuous furnishing of the papers directly from the chutes. They contend that the papers falling continuously are not evenly distributed around the tank and are liable to become "bunched or packed," forming "pockets" of dry papers which do not come in contact with the spraying liquor. The result is what is termed a "dry cook or bad bleach," the ink is not acted upon, the sizing of the papers and the vehicles of the inks are not thoroughly saponified, and on the later washing of the papers it is impossible to wash off the ink to produce a clean, white pulp. Another bad feature of these "dry cooks," besides the ink particles, is the paper itself in not coming in contact with the liquor will not be entirely reduced to a pulpy mass in washing and will not be thoroughly brushed out in the short beating time that it receives in the beaters. But it is fine enough for a good percentage of it to be screened lengthwise through the machine screens, and on being made into paper and calendered present a mottled or "blocky" appearance. These troubles are attributed to the method of scattering the papers across the top of the tank. To avoid this the papers, especially hard sized ledger and lithograph, are usually furnished in scattering armfuls and so being evenly distributed all the papers become saturated with the spraying liquor before the next armful is thrown in the same place. With soft sized magazine and book, the papers are delivered from the chutes directly into the tanks and are then raked and distributed evenly in the path of the spraying liquor by two men, one on each side of the tank.

Preparation of the Alkali Cooking Liquor

In preparing a new cooking liquor, or "fresh bleach," 1,200 pounds of soda ash are dissolved in water, heated and agitated until thoroughly dissolved. This is carried on in the alkali room, on the floor directly above the cooking or "bleacher" room. From the dissolving tank the liquor is run into the cooking tank, which has been cleaned out and made ready for the new alkali liquor. Fresh water is next turned into the cooking tank till it reaches a depth of 4½ feet. This is equivalent to 2,643 gallons, or a strength of liquor containing 45.4 pounds of soda ash to 100 gallons. With a hydrometer this liquor should test 9.15 degrees Twaddell or 6.105 degrees Baume at 60 degrees Fahrenheit, and at 180° F., which is the usual temperature at which the mill test is made, the readings should be 3.15° Tw. or 2.105° Be.

This strength of liquor will cook thoroughly 6,000 lbs. of ordinary soft sized book and magazine paper. This amount of alkali has been observed to produce the best results from long years of practice, and is taken for the standard for this grade of stock. For

The false bottom of the cooking tank after being raised and the cooked papers removed

cooking hard sized ledger and deep colored, hard sized lithograph the customary reading for the strength of liquor is 6.6° Be or 10° Tw. at 180° F., which reduced to 60° F. gives a reading of 10.6° Be. or 16° Tw. This reading is equivalent to 7.57 per cent of soda ash by weight, or 1,750 lbs. of soda ash is required to give this test.

While this amount of alkali is excessive, it is not considered economical to reduce this amount, for in so doing the resultant cooked papers might show defects of some kind or other. These defects are at once attributed to the way the paper is furnished and the wrong strength of liquor.

Before allowing the papers to be cooked over night

the liquor is again tested. A sample is taken as it is spraying over the papers and hydrometer and thermometer readings are taken. By referring to the scale of corrections for the temperature read it is an easy matter for the alkali man to ascertain whether the liquor is up to the required strength. If it is not quite up to the proper degree Twaddell he at once adds more alkali solution. All the liquors are tested and the results recorded on the daily report sheet, together with the amount of alkali used for each cook.

Table of Corrections for Temperature Readings

Temperature F	Heat Correction Tw.	Tw. Reading at This Temp.	Heat Correction Be.	Be. Reading at This Temp.
60	...	9.15°	...	6.105
68	.38	8.77	.25	5.85
75	.75	8.40	.50	5.60
82	1.13	8.02	.75	5.35
90	1.50	7.65	1.00	5.10
98	1.88	7.27	1.25	4.85
105	2.25	6.90	1.50	4.60
112	2.63	6.52	1.75	4.35
120	3.00	6.15	2.00	4.10
128	3.38	5.77	2.25	3.85
135	3.75	5.40	2.50	3.60
142	4.13	5.02	2.75	3.35
150	4.50	4.65	3.00	3.10
158	4.88	4.27	3.25	2.85
165	5.25	3.90	3.50	2.60
172	5.63	3.52	3.75	2.35
180	6.00	3.15	4.00	2.10
187	6.38	2.77	4.25	1.85
196	6.75	2.40	4.50	1.60
204	7.13	2.02	4.75	1.35
212	7.50	1.65	5.00	1.10

Length of Time for Cooking

The operation of filling each tank usually takes 1½ to 2 hours to furnish 6,000 lbs. of paper. This is allowed to cook from five to ten hours and even fifteen hours at times. Light book and magazine can be cooked thoroughly in seven hours, which is the minimum length of time that is possible to obtain good results. When there is a shortage of paper stock a tank is hurriedly furnished and cooked for five hours, but the results are far from satisfactory. Most of the ink has been acted upon, but a small percentage will sometimes remain uncooked and will reduce the quality of the resultant sheet.

For most of the hard sized ledgers and colored lithograph papers ten to twelve hours is considered sufficient, though if there is available time—that is, if there is a large quantity of cooked papers ahead of the washers—the cooking time is increased to as long as possible—to fifteen hours. This length of time is possible if the papers are furnished in the first tank filled in the morning. The tank will be filled by 9 a. m. and at 12 or 1 at midnight the papers are ready to be taken off.

Steam Used in Cooking

The amount of steam used in the cooking of the papers is an important factor in figuring the cost of this process, but as yet no definite data have been obtained as to the amount consumed. The pressure on the main steam line is reduced by a valve to thirty pounds, which flows thru an inch and a half pipe to each cooking tank. Here again the pressure is reduced by a valve and the amount of steam used is regulated by the number of intermittent showers or sprayings of the liquor desired per minute.

That the amount of steam used is excessive is admitted by those who have inspected this system. At times, after all the liquor has been sprayed up, it fails to return quick enough to form a seal below the false bottom for the steam to work against. The result is that live steam continues to be injected upwards into the open air until this seal is formed again.

In a few mills in order to retain the heat of the steam the tanks are cased with wood or an asbestos coating lines the outside of the tanks.

To reduce the amount of steam used it was suggested that while the cooking was going on the tank be covered with a wooden or iron cover. An opening, one foot square, was made in the cover about one

The hoisting mechanism of a cooking tank

foot from the circumference and to this was attached a wooden outlet which conducted the excess steam and vapor outside the building. It was observed that only a quarter turn on the valve allowed sufficient steam to give the desired frequency of showers of liquor over the papers. Before this arrangement usually a whole turn of the valve was considered necessary. During the test the excess steam and vapor which formed under the cover discharged into the outlet and was carried out nicely. On longer application it was noticed that the entire mass of papers in the tank was forced up and finally the liquor itself was found to be discharging into the horizontal section of the improvised outlet. Doubtless the lifting of the papers was due to the increased volume of liquor from the condensed steam that was being formed continually instead of going out into the air. The discharging of the liquor into the out-

let may be accounted for by the forcing upon the pipe of steam, vapor and bubbles of liquor, which would condense to a liquid. Because of this increased volume of liquor it was considered impractical to use a cover on the tank. Further tests should be made of this arrangement, for it has some good features.

One fact noticed while using this cover on the tank was the great difference in the amount of heat remaining in the papers when they were ready to be taken off. The papers in the tank were so hot that it was necessary to allow this cook to stand and cool off until the other cooks had been removed from the tanks. Even with this increased time for cooling and draining the papers were removed with only the greatest difficulty and discomfort by the men employed for this work.

While this great difference in the amount of heat retained by the papers causes added difficulties in the handling of them after being cooked, it is also beneficial in that the heat hastens and furthers the saponification action. The ink will be more completely broken up, dissolved and more easily washed out in the washers. The tendency which the ink has of collecting in small lumps will be dissipated in that the particles of ink after this high heat will be very finely subdivided and will form more readily an emulsion with the cooking liquor. Since more than two-thirds of the liquor is recovered and much more drains away while the papers are held in storage, the subsequent washing time for the papers will be lessened considerably.

Removal of Cooked Papers from the Tanks

The papers are allowed to cook the required length of time, and about midnight the cooked papers are raised by a hoisting device on the false bottom from the tanks. The hoisting mechanism is located on the floor above the cooking room, and consists of a mortise gear and horizontal wheel, the center of which is threaded to match the vertical hoisting rod. A large swivel hook is fastened to the lower end of the hoisting rod and hooks onto another large hook attached to the central pipe of the cooking tank. The attached prints will clearly illustrate the details of the hoisting mechanism and the manner in which it is driven. A 25-H.P. motor furnishes the power for this drive.

When the false bottom has been raised to within six inches of the top of the tank it is stopped and the papers allowed to cool and liquor drain back into the tank. Two men are employed to remove the papers at the rate of two dollars for each tank. Clad in the scantiest attire, usually a pair of overalls and wooden shoes, they mount to the top of the papers and then shove the papers off with pitchforks into suitable large cars or containers grouped all around the sides of the tank. The work is laborious and unhealthful because of the steam continually arising mixed with peculiar odors from the papers. The cramped position in which they work, always bending over, without opportunity of standing straight at their work is conducive for curvature of the spine and is a regular "hell hole" for tuberculosis. It usually takes two hours to fork off 6,000 lbs. of the cooked papers, so that the working hours is limited to 5 hours for each man. While the cost of handling the cooked papers from the tanks is quite small, amounting to about $0.0333 per hundred pounds, it is not the work a man should call upon his fellow beings to accomplish. However, there seem to be any number of men (in 1915) looking for work that would be quite satisfied even with this back-breaking, unhealthful occupation.

It is strange that this method described for removing by hand the papers from the tank should find such great application as it really does among the mills. It would be hard to say that this point has not been given a great deal of thought; yet the fact remains that no change has ever been made in most of the mills.

One scheme which has been tried and found to be very satisfactory consists in attaching four vertical rods equally distant around the false bottom, so that when the cook is raised these rods may be suitably fastened to an arrangement so that the entire mass of papers, still remaining on the false bottom, may be swung clear of the tank onto a track system and moved either by a crane or pulley over to a draining pit. The false bottom in this case is built so that it may permit dumping, by turning on hinges. After draining in the pit for a length of time the papers may be fed into a hopper or kneader located below the pit, which will condition the papers so that they can be pumped to the various washers.

Another plan which has been proposed for removing the papers from the tanks has been seriously considered. It consists of a mechanical device, either a rake or a clam shell shovel arrangement which will grip a mass of cooked papers and deposit them on to a conveyor. This conveyor carries the papers to two or three large storage pulping vats equipped with agitator arms. In this vat the papers are mixed with water and broken up so that the pulpy mass may be pumped to the washers through a continuous circulating pipe system. By this method the number of men employed whose duties consist in pushing the cars or containers loaded with cooked papers to the washers and furnishing them would be greatly reduced. At present it requires six men on each tour to tend the washers. One foreman receives $4.15, assistant $3.65 and four helpers at $3.40, or a total of $21.40 for a tour, or $64.20 per day is the total cost for labor to tend the washers. On a 40,000-lb. capacity for the washers this cost is 0.1605c per 100 lbs. for labor alone. It takes from 15 to 45 minutes to furnish a washer and for four hours this washer requires very little attention until

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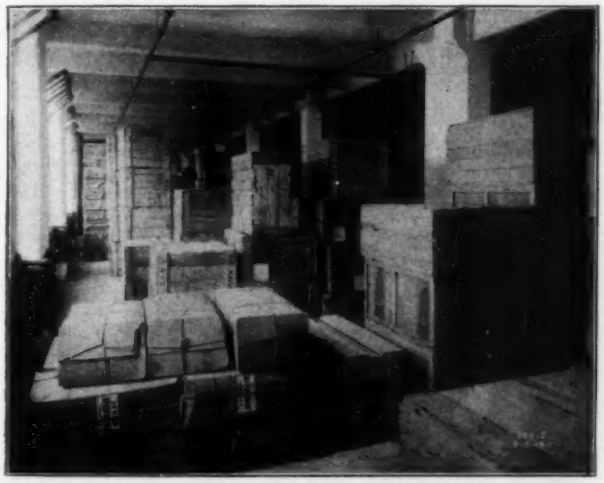
Concrete in the Paper Industry

By ANTON S. ROSING

THE use of concrete as a building material for industrial plants of every description has gained its well deserved popularity because of its peculiar adaptability for this purpose. Thousands of far-sighted business men are enjoying the advantages of this type of building, among them being many in the paper manufacturing industry. In this industry more perhaps than in many others the well recognized qualities of concrete as a construction material not only for the building itself but also for the many auxiliary structures in and around the plant fulfill the requirements better than any other type of construction.

Buildings for housing the paper industry must be fireproof, durable, sanitary, rigid, low in maintenance cost and economical. They must be able to support heavy floor loads and rapidly moving machinery, and must be adaptable to special design which will permit of the most efficient arrangement for manufacturing processes, machinery and storage space for raw materials, chemical solutions and finished goods. All these desirable qualities are most economically secured through concrete construction.



The light and cleanliness secured by concrete construction in storeroom

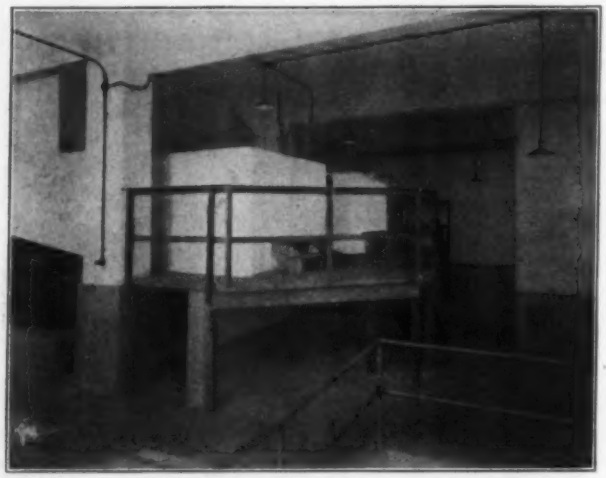
With the progressive business man first cost is of secondary consideration because he realizes that the ultimate test of economy of a building is in the service it renders. When every factor entering into the desirability of a building for manufacturing purposes is considered, concrete will be found to be the most economical. Nor should it at once be accepted that the first cost of a concrete building will exceed that of other acceptable types. Large buildings requiring special design and in which exceptional floor loads are the rule have been found frequently to cost no more when built of concrete than when built of other acceptable materials. As the cost of steel and lumber continues to advance, the difference in first cost between concrete construction and other types is steadily decreasing.

Office of the Magnolia Paper Co.

It is difficult to express the value of the fireproof qualities of a building in terms of dollars and cents. Insurance rates are based on various factors depending on occupancy, exposure and other elements of fire risk. Insurance companies have, however, accepted concrete as being the most fire-resistive building material and the rates fixed by them, when other hazard conditions are equal, will be found to be the lowest for concrete buildings; in fact, these rates are often so low as to merely cover the cost of carrying the insurance. Many manufacturers housed in concrete buildings do not carry insurance on the building itself. Insurance on contents of buildings also reflects the type of construction, and here also considerable savings can be effected if the building itself is of fireproof construction. Besides these known savings in insurance rates when enterprises are housed in concrete buildings, there is also protection against the uninsurable loss resulting from loss of business, loss of credit and loss of employes during the period required to reconstruct the building.

Depreciation is caused by the wearing out, rot or decay of the structural parts of the building and is computed as about 1 per cent of the total value of the building per year. Concrete buildings do not depreciate through rot or wear and tear due to the

weather and the elements; in fact, they grow stronger with age. City authorities have recognized this fact in allowing greater loads to be placed on the floors of old concrete buildings than on new. Maintenance charges on such buildings are negligible. There are no parts requiring replacement and no



Bleach tanks of concrete construction

painting. The sinking fund required on buildings which are of a depreciable nature is unnecessary when an industry is housed in a concrete building.

The very nature of concrete insures sanitation. Monolithic floors, columns and beams provide no recesses which furnish hiding places for dirt, dust and filth. Concrete floors are easily kept clean and are not affected by the application of disinfectants. Because the loads in concrete buildings are carried in the columns and beams alone, adequate lighting facilities are assured. Sunlight is nature's disinfectant and the concrete building provides window area which will permit a maximum of sunlight.

In the process of paper manufacture, heavy, fast-moving machinery must be installed, and it is essential to provide a firm, vibrationless base. Machinery anchored in concrete will stay put. Shafts will not get out of line nor floors become warped and out of level. The rigidity such foundations provide will save wear and tear on machinery and building.

The question of storage and handling of chemical solutions, bleach liquors and wood pulp, which are needed in the process of paper manufacture, is often a difficult problem. Many paper manufacturers have solved this difficulty by building concrete storage tanks and have found these tanks entirely satisfactory. Such tanks are free from maintenance, are permanent and have no ill effects upon the quality of the contents.

Not only inside the plant but in the yards concrete can be used to advantage. Walks and driveways connecting the various buildings of a plant draw the plant together and promote its efficiency. Concrete drives in the yards permit the handling of capacity loads at the least expense every day in the year. They bring the paved road to the very doors of the plant, and make efficient handling of materials the year round a fact.

Progressive business men realize the need of building for permanence and reducing maintenance and depreciation charges. Concrete buildings, driveways and tanks will solve the paper manufacturer's building problems. By building of concrete, manufacturers will be assured of a durable, economical and efficient plant which will yield them the same satisfactory service which such plants are now yielding to thousands of manufacturers under all conditions throughout the United States.

The Value of Waste Paper Stock in the Manufacture of New Paper

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it is time to empty and furnish again. The rest of the time the men are engaged in cleaning up the room, eating their lunches and trying to keep from stumbling over each other.

Two or three men would be sufficient to tend the conveyor system and the storage vat and the washers. It might be developed to a point where the entire process was a mechanical one and would only require a few men to tend the valves, etc. Surely a saving of $12,000 on labor is a good investment, and it would not be long before this system would pay for itself and maintenance in the decrease in cost over the present method.

As mentioned above, the hardest work that the six washer men have to do is to push or move the heavily loaded cars of cooked paper to the washers. It really does take the combined efforts of these six men to move one of these cars across the rough wooden flooring and even on concrete floors. To accomplish this work with fewer men one very enterprising mill has laid a small narrow gauge track system, sunk in a concrete foundation. These tracks extend from the tanks to each washer in the beater-room, and to sidetracks in the "bleacher-room"; these latter serving for storage of papers ahead of the washers. By means of this track system with small cars made to securely fit the rails one or two men can easily convey the cooked papers to the washers. However, their method of taking off the cooked papers from the tanks is by hand forking.

(*Continued in December number*)

Hazards of the Paper Industry

By GEO. P. HAMBRECHT

Chairman Industrial Commission of Wisconsin

THE Industrial Commission of Wisconsin recently compiled the accident statistics for the several industries in Wisconsin during the year 1918, from which compilation it appears that five per cent of all the compensatable accidents in Wisconsin occurred in the manufacture of paper and paper products, and the total lost was 139,993 days, or the equivalent loss of time for one man of 466 years. One-third of these accidents occurred on machinery. About twenty per cent were due to handling objects, and the next largest group was "falls of persons," which accounted for nearly fourteen per cent of the total.

Some of the principal hazards in the paper mill industry, gleaned from the accident reports above referred to, are as follows:

Wood Yard. The loading and unloading of cars has caused many accidents of a serious nature. The accident reports show that many workmen are hurt in handling flat cars. Care should be taken to see that the workman does not have to be in front of the car to loosen the stakes. If pulpwood is unloaded from box cars, substantial gang planks should be provided and these made secure. Care should be exercised in piling material along railroad tracks; ample space should be provided along the track, so that trainmen and others will have a clean path. Good housekeeping is as important here as in any other part of the plant, and by having someone whose duty it is to look after this, the yard accidents can be reduced. The use of locomotive cranes present special hazards, and those employed on and about them should be frequently cautioned as to the necessity of being careful.

The block piles are a source of accidents unless precautions are taken. Care should be used in the piling and removing of material to make them as safe as possible.

Slasher Mill. Seventy-nine accidents occurred in these mills in 1918, causing an average loss of 127 days per injury. All pontoons, bridges and walks on which men have to work over the water should be equipped with substantial railings to prevent men from slipping off into the water. If walkways are provided into the mill by the side of the conveyors, they should be protected so that there is no possibility of the logs becoming dislodged from the conveyors and onto the walkways. Walkways should have hand rails, well cleated, to prevent slipping.

The slasher saws should be so guarded that the operator is protected from injury in case material is thrown back by the saw. They should be covered beneath so that persons sweeping or cleaning up will not get in contact with them.

There were twenty-five barker accidents in 1918 out of a total of seventy-nine occurring in this department of the industry. The principal accidents on barkers, except drum barkers, are those to the eye, and here operators should be required to wear goggles. The goggles should be fitted to the user, so that there will not be the objection of using ill-fitted and uncomfortable goggles. Barkers should also be equipped with a positive feed, so that attendant will not be liable to injury of his hands. Drum barkers should always be equipped with a positive lock, so that there is no possibility of starting while a workman is inside.

Splitters should be maintained in such a manner that there is the least possibility of the work becoming loose and falling out.

Chipper accidents can be reduced by keeping the knives sharp and by placing guards so that material thrown out will not cause injury.

Sulphite Mill. In the manufacture of the acid there are hazards around the towers that are common to other industries, as for example, the elevators should be carefully maintained to eliminate all possible chances of failure with probable accidents in case of such failure. The state has an elevator code which will aid in determining whether or not an elevator is in a safe condition. All platforms should be provided with substantial railings and toe boards.

Digesters have not in this state been a frequent cause of accidents, and this can be continued with the proper inspections and maintenance necessary to guard against failure of the digester itself or of the blow-off valve. Accidents in this department of the plant are apt to be of a serious nature when they occur.

Sulphurous acid fumes are a health hazard and are generally noticeable. There is a difference of opinion among authorities as to just how much fumes are necessary to produce a health hazard, but now that the workmen's compensation act has been amended to include industrial diseases, as well as industrial accidents, the employer should take steps to eliminate all possible hazards from this source.

Ground Wood Mill. The principal cause of accidents in this department is slippery floors. Care should be taken to have proper drainage, and to have

the room well lighted and ventilated, so that employes will not stumble against objects they cannot see. This is particularly apt to be the condition during the winter months.

Rag Room. In mills having this department, the matter of ventilation is perhaps the most important, and all possible means should be taken to prevent the inhalation of dust laden air. The health hazard exists in this department quite as much as in any other, and steps should be taken to determine whether or not it is practicable to sterilize the rags before sorting. This would eliminate the dust conditions, as well as the additional health hazard of handling unclean rags. The machines in this department should, of course, be protected so as to cause a minimum danger to operator and others around them.

Beaters. There have been a total of sixteen compensatable accidents due to this cause in Wisconsin in the last four years, with an average loss of time of eleven days each. All of the machinery around the beaters should be amply guarded, and precautions should be taken to avoid accidents as a result of slippery floors.

Machine Room. In this department the principal causes of accidents in 1918 were the winders, with 58 accidents and an average loss of time of 61 working days, and the calenders with 45 injuries and an average loss of time of 146 working days. The calenders should be equipped with doctors and guards and emergency stops placed on the super-calenders. This would reduce accidents. The commission's orders require that winding reels be guarded, or the reels so constructed that it is impossible to have a space of less than eight inches between the rolls when they are of maximum size. Some serious accidents have occurred from this cause.

The stack reels can be made safe by reversing the direction of one of the reels. If belt-driven cross the belt, and if gear-driven introduce an idler gear. In this way the reels run in opposite directions and there is no nip or danger point.

Drum winders are the cause of accidents, the principal hazard being that of getting caught between the front roll and the winder shaft. This hazard can also be eliminated by a slight alteration, which will cause the front roll and paper to turn in opposite directions.

On the average paper machine there are about forty danger points due to belts, pulleys and gears only. This number is increased very materially if set screws are included. All danger points of this character should be carefully guarded. On parts that it is not practical to guard accidents can be reduced by the proper kind of shop discipline, and seeing to it that the employes do not engage in unsafe practices.

Lighting. Adequate lighting should be provided so that the operators can readily see just what they are doing. It is pretty generally known that good lighting reduces accidents, but just how many accidents are prevented by this means it is not possible to say.

Housekeeping. This means the general orderliness and cleanliness of a plant. Greater results can be accomplished here with the least expenditure of money than in most any other way. The neat and orderly appearance of buildings and grounds not only makes for a safer plant as far as health and accidents are concerned, but for fire prevention as well.

What the State Can Do. Many mills in Wisconsin have introduced a system of safety committees in connection with their Industrial Relations Department and the accident hazards in mills which have established organizations of this kind are reduced. A safety committee must have work to do in order to properly function, and proper guidance can always be furnished and constructive suggestions made by the manager of the Industrial Relations Department. These committees have coöperated with the Industrial Commission in many ways and a constructive program has resulted. The Industrial Commission can help the paper industry to eliminate accidents by making recommendations as to the safeguarding of machinery and the elimination of unsafe practices, as has been done in numerous plants in the metal trades industry. The deputies of the commission are always willing and ready to make helpful suggestions, and to give talks to foremen and workmen as to how they can help to reduce accidents. The commission is always glad and ready to receive suggestions from the management as to desirable changes in its rules. The commission does not draft rules or "orders" as they are called, but has an advisory committee who drafts the rules, and after a full public hearing, with suggested changes given due weight and credit by the Industrial Commission and the advisory committee, these rules are then formally adopted by the commission and become the safety standards in the industry until modified. The advisory committee for the paper industry, as are the members of the committee in other lines, are experts in their particular line.

The employer might comply with all of the requirements of the law as to safety and sanitation, and if this were all that was done, accidents would still take place unless the employer and employe cooperate and whole-heartedly meet on the common ground of accident prevention. The commission believes that with the employer, the employe and the state all working together and toward the same end, accidents in the paper industry can be very much reduced.

Difficulties Encountered in Printing Papers

Part III—The Shrink and Stretch of Paper in Color Printing

By PETER J. MASSEY

(*Continued from October number*)

NO paper should be laid directly on the floor, but on skids or lift truck platforms. This will protect the paper from water damage in the case of a flood from a broken pipe, sprinkler head or other cause, and will also protect the paper from the excessive heat from the floor, where the overhead system of heating is in use.

The successful color printers, through the adoption of some common sense methods in the handling of paper, have cut down considerably their register difficulties. These methods, while they have given satisfaction as far as they have gone, do not go far enough to overcome the effect of excessive humidity that generally prevails in the larger printing and publishing centers during the summer months, and the extremely variable humidity conditions in the midwinter months that are caused by artificial heat and the lack of temperature and humidity control in their plants.

In the majority of printing establishments where the ordinary steam heating system is being used, the temperature and humidity will vary from 52 deg. F. and 50 per cent relative humidity to 90 deg. F. and 72 per cent humidity in twenty-four hours. It cannot be expected that under these conditions any precautions can be taken in the handling or manufacture of paper that will entirely overcome such radical variables.

Methods of Handling

In the handling of the paper after it is delivered to the printer, there is considerable difference in the methods used. In some color printing houses the paper is opened up immediately upon arrival, piled on lift truck platforms to about a height of five and one-half or six feet, and left in the paper storeroom until the job goes to press, the piles being then taken to the pressroom as needed. This system is sufficient where the atmospheric conditions in the storeroom are ideal or where they closely approximate both the conditions at the mill and pressroom, but in some storerooms where the conditions differ radically from either one or both, it causes trouble with shrink and stretch on the ream or so of paper on top of each pile—which by the way will be the sheets used in obtaining register—and cause wavy edges throughout the balance of the pile. The wavy edges will cause almost as much register trouble as the top ream, because they will not lie flat at the guides and will, therefore, give sufficient variation in gripper hold to cause imperfect register.

In other printing establishments the paper is removed from its original package about a week or ten days before going to press and placed in trays with two or three hundred sheets to a tray. These trays are stacked in the pressroom or some room adjoining the pressroom, where the atmospheric conditions are approximately the same. The trays are so constructed that there is enough space interval between each tray to allow the free circulation of air. This "seasons" the paper, in other words, it gives the paper a chance to become adjusted to the atmospheric conditions prevailing in the pressroom before it goes to press to receive its first impression.

Pressroom Management

Before beginning the discussion of the more intimate analyses of the methods and precautions used in various pressrooms, it will not be amiss to call attention to the fact that, while the mechanical equipment has been developed to a high state of efficiency, there has been very little, if any, development of pressroom methods based upon practical scientific facts that take into consideration all the variable conditions and automatically point out the remedies. Until practical scientific methods are developed to overcome all the variables in raw materials, mechanical equipment, atmospheric conditions and personnel, and applied to pressroom practices, there can be no really efficient method of pressroom management.

A number of printers have contracted the "efficiency" craze. They point with pride to their very refined and complicated system, and inform you that, while it adds a fabulous amount to the operating expenses, it is well worth while, because it surely pays for itself. If by any chance the statement is true and it does pay for itself, it is about all that can be said for some of these so-called "systems." In almost every case they have been installed and developed by outside engineers, who have no conception of printing pressroom requirements or any scientific knowledge of the raw materials used in the processes. In many instances they have succeeded in installing a

system that is worse than no system at all, because they have attempted to apply machine shop practices to printing pressrooms without making a study of the fundamental principles underlying the pressroom processes. Instead of developing a spirit of co-operation between the management and employees, these systems tend to develop distrust and coercion.

In regard to the cost system, it is not claimed, even by its most enthusiastic advocates, that it can assist in any material sense the development of efficient methods in the pressroom. Its functions are not to work out a more efficient method of making-ready, for instance, but to indicate with some degree of accuracy the amount of money gained or lost on each particular job of printed matter, irrespective of the inefficiencies of the various processes and materials that enter into the manufacture of the printed matter.

We must be careful not to form the impression that improvements are not being made in pressroom technic. There are many executives who are continuously developing their methods and whose cumulative efforts have been the cause of instituting a number of progressive measures throughout the industry. A few years ago it was the custom to shut down the heating plant in cold weather on Saturday night and start it up again on Monday morning. The troubles that were met in attempting to start up the presses, such as hard, shrunken rollers, improper flow of ink and static electricity, resulted in so much lost time and inferior work, that the production for Mondays was very seldom more than half and never more than two-thirds of the regular output. It is only through the individual efforts of the more progressive color pressroom executives that sufficient steam is now provided to maintain a temperature of 70 degrees F. continuously, irrespective of the shutdown periods. These improvements are not the result of efficiency or cost systems, but are the achievement of individuals sometimes in spite of the system, and proves conclusively that any system to be of real economic value to the industry must have as its principal function the development of scientific methods in the manufacture of printed matter.

Pressroom Operations

A number of color pressroom executives have worked out systems of handling their work that takes into consideration the hygroscopic nature of paper. In these pressrooms the problem of "shrink and stretch" is a negligible matter, except during periods of excessive humidity or extreme changes in relative humidity. Even with poorly made papers that would be rejected by the ordinary printer they are able to "get by" when operating under conditions that approximate the normal.

Every job is laid out, planned and executed on certain definite principles and procedures that take into consideration not only the raw materials, such as ink and paper, but also the variations in the mechanical equipment and the qualifications of the personnel on each unit. These executives have also had sufficient practical experience in the art to know not only when the pressman is trying to put "something over" on to the paper or ink that rightfully belongs to the make-ready, but can show their employees where the trouble lies and advise them as to what remedial measures they should take to overcome the trouble.

Process Work

When an order for three or four color process work is received the required number of presses are chosen from the available equipment that the executive knows from experience or personal inspection have the same gripper hold or tension, have the brushes set at the same angle and pressure, and the bearers set at the right height to allow for the one, two or perhaps more underlays used in the system of make-ready in that particular pressroom. When these precautions are taken the possibility of defective register is considerably reduced and the quality of work is greatly improved, as the sheet will be held with the same degree of gripper tension and the same "drag" from the brushes and form on each unit.

Fixing the Responsibility

Whenever possible one pressman is given the responsibility of printing the entire job or one side of it throughout the two or three impressions necessary for a complete print. Never is the work scattered throughout the entire pressroom indiscriminately. Even when the orders are for such long runs that it taxes the full capacity of the pressroom, the forms are divided in such a manner that each pressman will make-ready and print the complete cycle of colors for one side of the sheet. Under these conditions the maintenance of uniformity in the finished product is a comparatively easy matter. Since the majority of color houses are now equipped with two-color presses, it is not a very difficult problem to lay out the work in such a manner that each pressman will be enabled to produce a complete three or four colored job, as each individual pressman is in charge of two two-color units capable of producing a four-colored print with each impression of his two units.

But even in comparatively antiquated establishments, where the entire equipment is single-color presses, a three or four color job should never be split up among three or four pressmen if it is desired to produce good quality work. The division of responsibility on a job allows so many additional variables to enter into the finished product that it is almost impossible for the executive of a large plant to judge with any degree of accuracy where the deficiency lies when a job is poorly printed. In cases of this kind it is almost invariably the rule to place the blame on either the paper or ink, which in many instances is very unjust. In a pressroom using single-color equipment one man should be given the

progressive proofs and full charge of the complete cycle of colors for one side of the job. He should set the grippers, brushes and rollers, make-ready the job, set the color, get an O. K. on each color and on the completed sheet. After receiving his O. K. from the superintendent, it should be his duty to supply the various pressmen under whose jurisdiction the separate units belong, sets of color guide sheets for them to follow and see that they are followed throughout the run. He should be held strictly responsible for the quality of the finished product.

When the forms for a color job go to press, the foreman, or in the case of a large pressroom, the assistant foreman, must see that each set of forms are laid out on their respective presses, so that each set, irrespective of the number of presses required, falls to one man, the bearers on these units are set sufficiently above type high to allow for the required number of underlays, the same gripper bite is given the sheet on each unit, the same spring tension on each gripper rack, the side guide at the same distance from the bearers, and that each form contains a press marker in the margin to denote upon which press the work was performed. These precautions will save considerable trouble later on.

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Factors Affecting the Durability of Wood

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given a two-brush coat treatment with a coal-tar preservative previous to erection and gave fourteen years' service. It should be noted that during the latter period conditions in the machine room were slightly improved. A third roof deck of Norway pine was placed in 1917, the lumber and girders (12″ x 14″, built up of 2″ x 12″) having been thoroughly creosoted by the open tank process. The plant used for this purpose, as well as for the treatment of all structural wood employed under conditions favorable to decay, is shown in Figure 6. In this same mill a white pine hood, directly over the machines, the lumber of which was merely brush treated, had been in service eleven years when inspected.

(c) Part of a long-leaf yellow pine machine room floor, thoroughly brush treated before placing, and protected from mechanical wear by steel plates, alternately wet and dry, was found to be in good condition after five years' service. An untreated portion had begun to fail due to decay.

(d) Ventilators on the machine room of another mill, the lumber of which was also brush treated, were still in good condition after ten years' service (Figure 2). The superintendent who gave this information stated that untreated ventilators must be replaced in from six to eight years.

These experiences could be augmented by many additional records, but they will suffice to indicate that surface treatments, though considered the least efficient of the approved methods, have considerable value when properly applied to seasoned wood. As many and possibly more cases of failure could be cited, but in every one which the writer has had an opportunity to investigate the cause was employment of green, unseasoned timber.

Notwithstanding the fact that surface treatments have merit and should be used when a more effective method is not at hand, large industrials who employ structural wood for repairs and new construction which will be exposed to conditions favorable to the development of decay, should equip themselves to use the open tank system. It does not require an elaborate plant; merely a tank or two and steam for heating the preservative (Figure 6).

As far as results from treatments by the open tank system are concerned these are fully comparable with those obtained by pressure treatments when seasoned wood of species not resistant to injection of creosote oil is employed. Loblolly pine timbers, sound grade, averaging less than six annular rings to the inch, and of about 12% moisture content, were immersed in the heated preservative for about one hour and absorbed an average of 8 pounds of refined creosote per cubic foot. Yellow pine car sills, 5 x 8 southern yellow pine, dense grade, thoroughly seasoned, were impregnated equal to an average absorption of 10 pounds of refined creosote per cubic foot by an 18-hour treatment, i. e., hot treatment for six hours and cold treatment for twelve hours, cooling over night to atmospheric temperature. Lumber and timbers of smaller dimensions of most species of pine containing fair percentages of sapwood are more readily treated, and in many instances short immersions in the heated preservative, hot bath only, results in thorough impregnation.

The open tank system has its limitations. For its proper employment the conditions must be suitable or made so. Wood which is green cannot be successfully treated excepting in the case of sap-pine and other pines of quick growth and few rings to the inch, which are very readily impregnated and from which sufficient moisture can be driven by simply increasing the temperature and prolonging the period of the hot treatment. Such cases are the exception. When species of wood resistant to injection of creosote oil are to be used, and a satisfactory penetration is not obtainable by the open tank system, and where mechanical abrasion is an important factor against which the lumber cannot be readily protected, a pressure treatment should be specified. In all instances, however, where for some good reason proper impregnation of the wood is not possible and these methods are not available or desirable, the application of surface treatments, especially to points of contact, is most decidedly preferable to no treatment at all.

Power Plant Economy

By E. E. PFISTERER

(This paper was presented at the meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents' Association, at Kalamazoo, on Oct. 20, 1919)

IN ordinary paper mill operation the boiler room is considered a necessary evil, a dumping ground for wood refuse, or at best a considerable worry to the management. Usually the boiler room is more or less neglected, because several persons take a hand in the operation, and no one man is allowed an opportunity to study it and follow up his theories by actually trying them out in practice.

When one considers the paper industry among other industries, one will find that the boiler horsepower in use is only exceeded in two other lines of endeavor—namely, by the iron and steel and lumber businesses. As regards the use of power per $1,000 worth of products, the paper mills require 4.88, while only one other trade manufacturer exceeded this amount of power; so it is very important that the paper mills should think about the possibilities of coal saving. An average mill requires from 50 to 60 tons of coal per day of 24 hours; there are many mills using over 100 tons of coal per day. If 10 per cent of this coal were saved in each plant in the state of Michigan it would be a big item. Or, if the boiler rooms were operated in conjunction with other parts of the plant along efficient lines from the standpoint of practical commonsense efficiency, large reductions in coal would result.

When the fuel administrations were in operation in the various states they were able to accomplish very surprising results in some cases. But best of all they were able to instruct a great many plants along proper practical lines of efficiency, which instructions when carried out produced very good results. I will mention a few of the suggestions as they are all of practical value.

First: Install signs in the plant asking employees to turn off the electricity when not in use.

Second: The management should keep all windows cleaned, allowing the daylight to enter for as long a period as possible.

Third: Have steam pipes covered and eliminate heat losses due to radiation.

Fourth: Install clutches on line shafts so machines can be cut off when not in use.

Fifth: Keep out the cold by keeping doors and windows tight.

Sixth: Indicate your engines at regular intervals to ascertain if same are operating properly.

Seventh: Keep motors running as near rated capacity as possible. Underloaded motors operate inefficiently.

If proper attention is given some of the above points it will be found considerable saving can be made. In one plant that the writer inspected, the friction load of the shafting was about 25 per cent of the entire boiler capacity, and, as it was in a fairly large plant, this could have been reduced considerably. As every boiler horsepower produced costs between $60 and $80 per year, it can be readily appreciated that every horsepower saved means an increase in the financial returns.

Considering the probable losses in the boiler room proper, the following points should be given careful consideration:

1—CO_2 in flue gases.
2—Combustible in the ash.
3—Dirty boiler flues both outside and in.
4—Blow-off valves.
5—The use of dirty water in boiler.
6—Flue gas temperatures.
7—The personal element—i.e., the fireman.

Now, a word of explanation regarding each of the above:

First: Samples of CO_2 should be taken and the excess air determined. If possible excess air should be reduced to a minimum, but practical considerations depending upon furnace design, brickwork and boiler conditions should be considered.

Second: The ashes from stokers or hand fired furnaces should be inspected periodically to ascertain if too much good coal is going to the ash pit. Fireman should be taught to exercise care in dumping and poking.

Third: The use of mechanical soot blowers and tube cleaners should be encouraged. Soot is among the best of insulators and a tube covered with soot on the outside or scale on the inside cannot be expected to transmit as much as a clean tube.

Fourth: Blow-off valves should not leak. Neither should it be necessary to blow off boilers too often or too long. Hot water wasted is lost coal.

Fifth: If boiler water is dirty or subject to scaling activities, it should be treated before it goes to the boiler. In plants using condensate the make-up can be distilled water and scale trouble can be eliminated. Every day a boiler is down it means a large investment idle. Count the days of the year your boilers are idle.

Sixth: Watch flue gas temperatures. If they become too high you may be forcing your boilers, or your tubes might be dirty so the heat cannot be absorbed, or you might have an abundance of boiler scale in the tubes, or you might profitably install an economizer. When one considers that for about

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Increased Production

By LESTER MILKEY

THE great need of the hour is a reduction in the cost of living. We hear this on all sides, yet the only way in which the cost of living can be reduced is by increasing production. No thinking man doubts the truth of this statement.

Incidentally increased production serves the double purpose of lowering the unit cost of manufacture and increasing the available supply of the commodity produced. Both are extremely necessary at the present time if an economical crisis is to be avoided in this country. The manufacturer's selling price or the cost to the consumer must of necessity be based upon the cost of manufacture and consequently there can be no reduction without a similar one in the cost of manufacture.

The law of supply and demand is in effect now as it always has been, but in nearly all commodities, paper included, the demand today exceeds the supply to a greater degree than it ever has before, and we have in consequence a very acute situation.

This problem of reducing costs is awaiting solution by the paper mills as well as by the packers, textile mills and other industries which so greatly affect the welfare and prosperity of a nation. Let us hope that the obligation will be assumed by the paper industry with a vigor that will insure the desired results.

The individual mill that takes the necessary steps to increase its production—and in so doing it reduces its unit cost of manufacture—not only is serving mankind by fulfilling a moral obligation which just now is a great one, but is also establishing itself in a position of strength that will weather it safely through the extremely competitive period into which we must sooner or later pass.

Usually it is the mill superintendent who is responsible for the production of the mill, both as regards quality and quantity. He should, therefore, at all times be on the alert for any new improvements in machinery or methods that will enable him to increase production. There is not a single paper mill but what could at least to some degree add to its production without lowering the quality of the paper. New devices and methods with this as their purpose are constantly being brought out. They are the so-called fashions that exist in paper mill machinery the same as in wearing apparel, and the superintendent who entirely disregards them soon finds himself accompanying last year's hats and shoes to the rubbish heap. Progress itself is based upon a succession of fashions, the best of which we permanently adopt as improvements. Of course, not all of these fashions or offerings are worthy or suitable of adoption. A mill might easily go bankrupt if it endeavored to put in all the new equipment and methods that may be obtained unless it was in the position of the superintendent who recently decided he could generate his power for nothing by simply adopting the boiler house appliances of five different salesmen, each of whom claimed he could cut down the boiler house cost 20 per cent. And he had guarantees from each of them to prove it, he said.

The capable superintendent can and must select that equipment for which he has a real need in his plans to increase production. His success, or, to put it in a concrete way, his remuneration, to a large degree depends upon the judgment he uses and the way he meets this responsibility. The temptation is great to become satisfied with simply maintaining existing standards of quality and production, but the fallacy of that plan is the fact that standards themselves are rapidly changing because new conditions like those we now have are constantly arising.

It is evident that it is up to the paper mill superintendent to constantly do all in his power to increase the production of his machines. This, of course, is not a new duty nor one unfamiliar to the majority of superintendents, but it takes on increased importance just at this time.

Contrary to a general opinion which seems to prevail, much of the special equipment that is offered by the machine builders and the manufacturers of various mill appliances constitutes real improvement and has but to be used to be fully appreciated. The wise superintendent gives careful consideration to all of it, and, with a careful investigation of the conditions on his own machines, he readily determines the equipment for which he has real need and he knows that if he needs it at all he can better afford to have it than to be without it. Nor should the so-called high costs that now exist prevent or delay one from immediately putting in such needed equipment. It is the delay or postponement that proves to be expensive. It should be borne in mind that this equipment can be paid for now with 50-cent dollars, whereas the future profits in the period of business depression that is certainly ahead of us will be paid in 100-cent dollars. This argument can successfully be used with obstinate managers who hesitate to make any purchases because they are expectantly awaiting a slump in prices.

There are many lines along which an ambitious superintendent may proceed in his effort to increase production, for opportunities exist everywhere.

The superintendent of a mill is overlooking great opportunities if he does not call in for consultation the representatives or field engineers of the various

responsible concerns manufacturing mill equipment. These representatives are specialists in their own particular line and can give the superintendent the benefits of that specialization. To take advantage of this service is just good common sense and many a successful superintendent owes a part of his success to an open-minded policy of that kind. To call in these field engineers or specialists for interviews places the superintendent under no obligation except that of impartially deciding, after a full knowledge of the subject, whether or not he needs the particular equipment under consideration. The modern sales engineer does not want to sell the customer equipment that is not really helpful any more than the mill wants to buy it. He knows as well as anyone that it doesn't pay in the long run.

Sometimes just a thought expressed in an interview of this kind will lead to a plan for increasing the speed of the machine a few feet per minute; and that is worth while. As an illustration of this, the superintendent of a large book mill recently called in the field engineer of a company building suction couch rolls. In the interview that took place it developed that the particular machine under consideration could be speeded up considerably if more forming surface on the wire could be obtained. The superintendent naturally supposed that the only remedy was to rebuild the wet end and put on a longer wire, but this entailed so many other changes that the management refused to consider it. The field engineer, however, showed the superintendent how it was possible to install the suction couch roll with the wire running level on top and by placing the wire guide roll underneath on the return side of the wire the desired extra forming surface could be secured without increasing the length of the wire. It was, of course, necessary to lengthen out the deckel straps and move the flat suction boxes nearer to the suction couch roll, but these were not expensive changes, and altogether the production of the machine was eventually increased several hundred pounds per hour.

In another case the superintendent knew or felt that the limiting factor in the production of a certain machine was the drying capacity. He wanted to add more dryers, but had no space for them because his machine room was already cramped. He was about to permit himself to become satisfied with conditions as they were when he came across an advertisement of a manufacturer who claimed his special equipment would increase production without the necessity of more drying surface. Being one of the modern type, this superintendent promptly sent for the field engineer of the company whose advertisement he had read. The field engineer came and went over the situation with him. Dry tests were made on the sheet at various points on the machine and these were compared with what was being done in other mills. It was not difficult for the field engineer to convince the superintendent that he could, by converting one of his press rolls into the suction press type, take out more water before the sheet got to the dryers. In this way the same number of dryers could actually handle more paper, since there was less water to be evaporated. Needless to say, the equipment was installed and an increase in production effected, while the expense involved was only a part of what the new dryers would have cost.

These and many other illustrations merely show the opportunities that exist. It behooves the superintendent to first determine what is the limiting factor in his production. Once that is known he can usually eliminate it if he will but take advantage of these ordinary opportunities. The word "ordinary" is used advisedly, because, like all opportunities, they are so common that they are apt to be overlooked.

Since paper is such an essential commodity in our daily lives, who can say but what a decrease in the cost of paper manufacture brought about by more intensive production will be the last straw to break the back of the high cost of living?

Power Plant Economy

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every 20 degrees of flue gas temperature above atmospheric temperature a loss of 1 per cent of your coal is going on, it is not difficult to figure what saving can be made by reducing the flue gas temperatures. Plants operating for long hours or plants having boilers which must be overloaded can usually justify an economizer installation.

Seventh: Consider the fireman as a human being and co-operate with him. Help him understand his problem and show him how to produce better results by giving him information about the equipment he is handling. There are many firemen willing and earnest who would be glad to improve their operation if they only knew how. They look to the chief engineer for assistance. He should give it. If you install instruments tell your fireman how they operate, what they show and how he can operate to get good results. It is a fact in most boiler rooms the firemen never have anything explained to them but the steam gauge, and they are told to keep steam at one pressure. This they try to do, and if they succeed they feel they should not be blamed for anything going wrong. Tell your fireman what he should do and tell him the instruments only help him to do that thing right. If more managers would co-operate with chief engineers and they in turn look to their firemen, bearing in mind some of the above points, substantial economies could be secured.

How We Solved Bleach Pipe Problem

By W. H. SCOTT, M. E.

Kalamazoo Paper Co., Kalamazoo, Mich.

THIS story of the solution of our bleach pipe problem might be told in very few words, if only the bare facts were given, but for the information of readers of The Paper Industry who may or may not have encountered the same problem, it has occurred to the writer that some details might be interesting and helpful.

Fig. 1. Showing tuberculation and pitting of wrought iron pipe

Fig. 2. Showing cast iron fitting practically free from Tuberculation and pitting

Every mill superintendent using chlorine bleach is more or less familiar with its action on metal pipe, and experience has pretty well demonstrated that as between steel and genuine wrought iron pipe the latter is much more resistant to this action. In our own mill the difference in durability was found to be so pronounced that for some years only genuine wrought iron pipe was used, even though its service life was never as long as its high cost would seem to warrant.

It was thought at first that this service life might be increased greatly by lining the pipe with lead, and this was tried, but the results in increased life were not in proportion to the greatly increased cost. In the first place there was frequent disturbance or disruption of the lining by its rolling up or "crinkling" at the end of the pipe when making up the joints, thus allowing the liquid to get in behind the lining at these points, and, in the second place, this lining furnished no protection to the outside of the pipe, which was almost as vulnerable as the inside. For these reasons lead-lined pipe was not found particularly economical.

While the pipe used was always galvanized, hammering to assist the flow resulted in destruction of the galvanized coating, and wherever the men touched the pipe with hands wet with the bleach liquor corrosive action was greatly accelerated. This action was also accelerated by the vapors from the washers, especially at the fittings, where failure to make up the full pipe thread usually left exposed some ungalvanized threads. The greatest difficulty experienced, however, was the rapid filling up of the pipe through tuberculation, or deposits of lime on the inside, a fair sample of which is shown in Figs. 1 and 3. This tuberculation was so rapid as to entirely cut off the flow of liquor within a few months, despite frequent hammering of the pipe while in service to dislodge the deposits.

It was therefore necessary at frequent intervals to disconnect the pipe at certain points and clean the entire line, but pitting underneath the tubercular deposits was so rapid that this cleaning soon developed leaks that rendered the pipe useless.

In taking the lines apart for cleaning or replacement it was observed that the cast iron fittings were practically free from tuberculation on the inside, and, while heavily coated with rust on the outside, there was no evidence of "pitting" or appreciable loss of

thickness through scaling. This is clearly shown in Fig. 2.

The nautral conclusion from this observation was that cast iron pipe would give better service than

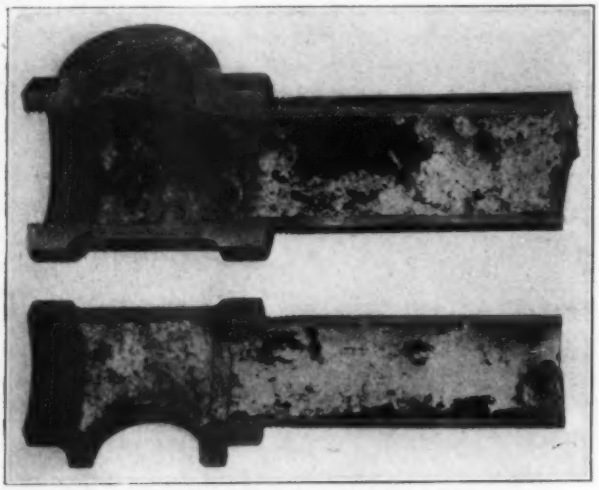
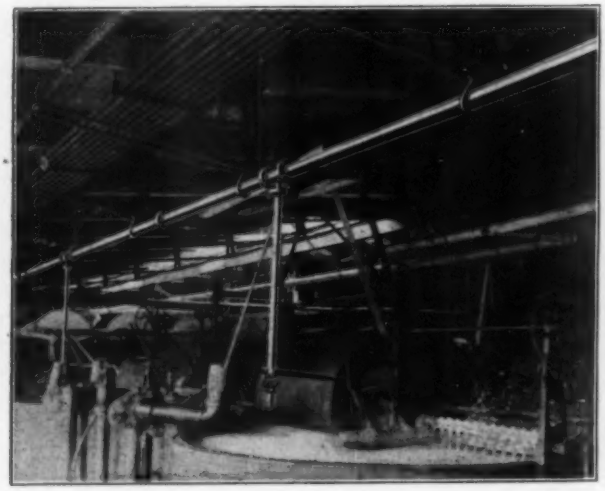


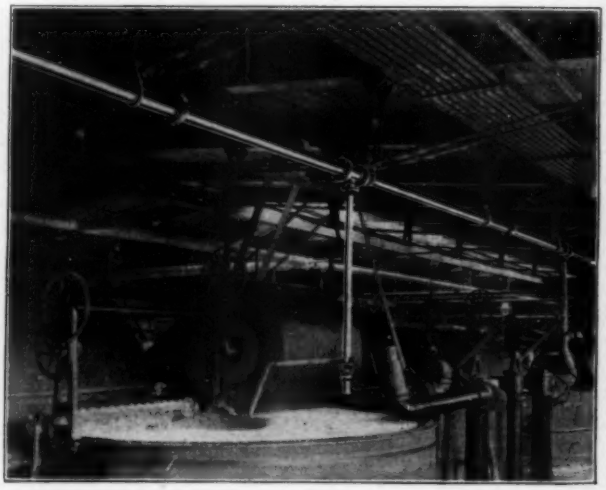
Fig. 3. Sectional view of tuberculated wrought iron pipe

wrought iron. Up to this time we had only thought of cast iron pipe in connection with underground fire lines of large diameter, with bell and spigot caulked joints, and made in arbitrary lengths of 12 feet. A little inquiry disclosed the fact that it could be had in sizes as small as 3 inches diameter, and in random lengths up to 12 feet, with flanged joints, which could be made up quickly with gaskets and bolts. An order was placed with one of the cast iron shops for some 3-inch flanged pipe in lengths of such dimensions as to insure the proper location of the fittings with relation to the washer, and our experience with this was so satisfactory as to lead to the replacement of all the wrought iron pipe we had in this service with cast iron, some of which is shown in Figs. 4-5.

For the down pipes wrought iron is still used, as its higher tensile strength renders it more immune to damage from exterior strains, blows, or the like, and, while its service life is limited on account of its susceptibility to corrosion, the small quantity used at these points does not make its frequent replacement a large item of expense.

The main cast iron pipe lines have now been in use long enough to demonstrate that they do not require cleaning one-third as often as wrought iron, and when cleaned, show no appreciable damage from corrosion. On the outside the cast iron pipe becomes heavily coated with a brown "fuzz" or spongy rust deposit, this peculiar form being due probably to the moist vapors from the washers, and this coating seems to have a more or less protective effect on the metal.





Figs. 4 and 5. East and west views respectively, showing cast iron pipe bleach line

Besides increased efficiency in flow of bleach our junk pile has shrunk considerably during the past year, and we do not expect it will ever be as large again as it used to be.

Improved Method of Beating

By H. J. ANDREWS

HAVE you ever stopped to think that during the last 25 years very little improvement has been made in the beater room in the way of equipment? The writer of this article has been familiar with the manufacturing end of the paper business for many years, and he personally knows of a great many mills that are operating the same old beater room equipment they did 20 or 25 years ago. While they have greatly improved all other departments of the mill, the beater room has been sadly neglected.

What department in the mill is more important than the beater room? We'll answer this question for you—none; absolutely none. Your stock is first prepared there, and if the preparation isn't good, the finest equipment in the world can't produce a good sheet of paper.

What department uses the most power? In nearly every case it is the beater room. Have you ever thought about saving power in your beater room? If you have, you are numbered among the few. The average papermaker has about despaired of saving power in the beater room, but it can be done.

The Abuse of Equipment

So many times we find the beater room power abused; rolls will be set hard or Jordans screwed up, when there is no occasion for it and when no good is being done, yet power is wasted.

Not long ago we visited a new boxboard mill, and in the course of our travels around the mill we noticed that the beater engineer, in setting the Jordans, would stand on the wheel to get the plugs up good and tight. It is safe to say that that mill is wasting 250 per cent of horsepower it would normally take to drive this engine, and the plugs and fillings are only giving 10 per cent of their natural life.

The Improved Unkle Extractor

In beating any grade of paper stock, whether it be old papers, newspapers or magazines, it is a mistaken idea that this stock needs much service on the bedplate of the beater. These old papers, etc., were beaten enough when they were formed into a sheet the first time, and the more beating they receive the more lifeless the stock becomes. While this is not a new idea at all, yet the question that has confronted the papermaker has been how to handle the stock through the beater without too much grinding, as is being done in most cases.

The Finished Stock Leaves Beater

It is also common knowledge that after charging a beater and beating for a few minutes there is a certain percentage of the stock that is ready to leave the beater, for if it stays in the tub until the whole charge is perfectly refined, a portion of the contents has been overbeaten, and what does that mean? It means a waste of power. If the stock can leave the beater as soon as it is ready, and then new stock added, it certainly means an increased capacity for the beater, and naturally if one beater's capacity is increased to a point where other beaters that have been in use can be shut down, you are saving power, but when the beater that has been increased is driven with one-half its normal power, then the power saving becomes firmly apparent—and how is this accomplished?

Keeps the Roll Off the Bedplate

Beating under this system, you never set the roll on the bedplate. On the other hand, it is kept from three to four inches off the plate, and thus while the capacity is increased, the power is no more than would be required to turn the beater with the roll up. After the beater, having been charged, makes a few revolutions, disintegration immediately begins, and a portion of the charge is sufficiently refined to leave the beater.

This finely prepared pulp travels over the top of the roll—it does not go under as does the coarse unrefined part of the charge, and it is this fine stock that the Unkle improved extractor takes from the beater.

It consists of a beater hood perforated on the front side with holes 1½ inches in diameter. Across these perforations is a series of scraper blades on a rod and running in guides. As the roll turns, a worm gear attachment furnishes an oscillating movement to these blades, and they are constantly traveling back and forth over the holes when the roll is in motion.

Installation Easily Accomplished

The only thing that is done to the beater is to bore four small holes in the end of the spindle so as to permit the fastening of a short arm or shaft, on to which is placed a pulley which is belted to the small pulley driving the worm gear attachment. The bracket holding the worm gear is firmly bolted to the side of the cab and supported by bracing rods.

Covering the perforations and scraping blades is a water-tight box that slopes towards the mid-feather of the beater on the bottom side, so that any stock that comes through the holes falls into the box and runs by gravity to the end of the box, where there is an outlet, which can be piped directly into the chest if it is conveniently located.

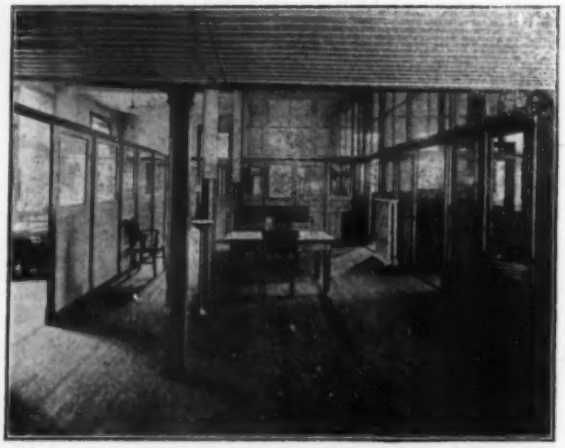
It is necessary to employ hot water in the beater. Water at 100 to 120 degrees will give results, but hotter water will be more effective.

(Continued on page 627)

Comments on the "Score Cut" Theory and Practice of Slitting and Rewinding

By W. B. WILSHUSEN

THE improved type of slitting and rewinding machine based upon the use of what is called the "Score Cut Principle" was a radical departure from the old principles, which naturally aroused certain doubts in the mind of the average practical mill man.



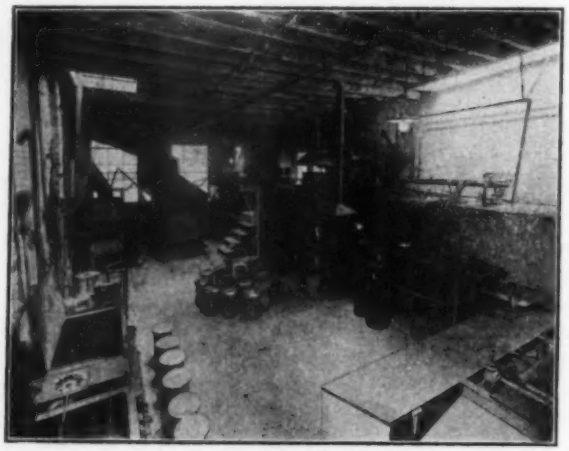
Sales and Service department

North Side assembling room

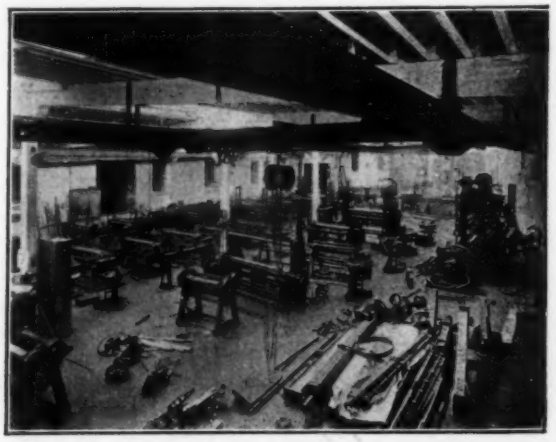
It is the well known trade term that is applied to Cameron made machines, and thus distinguishes them from all of the old style rewinders which involved the use of rotary shears or revolving slitter or saw blades or any other means of severing a web of paper prior to rewinding same into rolls.

The present plant bears testimony to the fact that it pays to back with courage and ability any sound commercial or mechanical idea—better still, to do so with undivided energy. In other words, specializing in a certain type of product where there is sufficient field or market to grow in, means that all of the advantage that is possible to secure by energy and ability can be secured by the concern itself and also can be delivered to the patrons of that concern.

The class of users that require a line of machines which will produce various sizes of rolls, from the smallest of midget rolls up to the ordinary run of printing rolls and bag rolls, and all sorts of specialties where accuracy and speed and a great variety of work are required, are the proof that this principle is here to stay.



Cutter Hardening department



East Side assembling room

The plant is being developed along the lines where the product can be handled to the best possible advantage in economy and perfection of work, with the single purpose in view of building first class slitting and rewinding machines and nothing else. This has of course meant continued research and testing out of new methods for handling the work to the best advantage; also constant improvement in the company's methods of manufacturing their machines. In the production of their cutter apparatus, including the flint-hard steel rolls against which the "score cutters" press, the highest skill and technical knowledge in heat treatment of steel has been called for and much original research was necessary to perfect this remarkably efficient method of slitting.

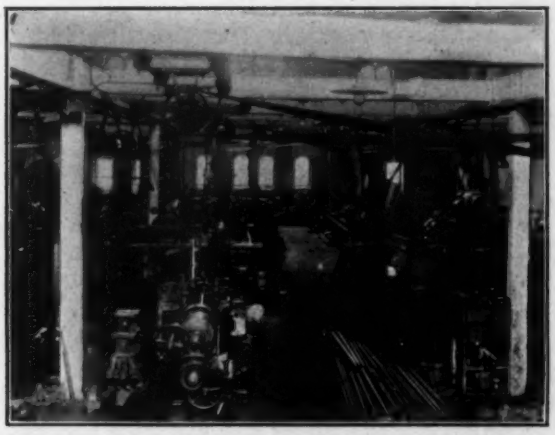
The industries using roll paper are becoming more exacting year by year, and the requirements for various sizes and kinds of rolls are becoming more complicated year by year.

A decade ago this standard had been very low indeed with respect to the kind of rolls produced by the average paper mill. The customer, however, is becoming more impatient of defective rolls, as he realizes that these defects can be overcome by the use of modern machinery specially designed with the view to getting the highest standard of excellence.

Our impressions are that this is the age of specializing and that the good old days when a machine shop would take on the building of anything from a mouse trap to a paper machine are passed and gone. Machine design and manufacture are narrowing down more and more to specialization, and the results of specializing are rather handsomely shown in the achievements of Cameron Machine Company.

The new heavy-duty type mill rewinder, which has been in the course of development for the last several years, has arrived to such a stage of perfection that it will soon be in the quantity production stage.

South Side assembling room



Parts Machinery department

(*Continued from page 625*)

At the high end of the box is a cold water connection, which helps the stock get away and also cools it. Hot stock is not good for felts, and that is overcome by this water line.

Our boxes are all fitted with 2-inch connections, but if there is not a 2-inch line handy to the beater room, it can be smaller, providing there is sufficient pressure—a maximum of 40 pounds is satisfactory.

The cleaner the stock furnished, the better the results obtained, but no matter what kind of stock is furnished, nothing but the cleanest kind of pulp is delivered by the extractor. The refuse all remains in the beater, which should be cleaned out three or four times a day. Just before cleaning the beater, it is advisable to close the discharge and drop the roll for twenty to thirty minutes. This will take care of the strings and rags that are in the beater. The beater can be cleaned so quickly that the loss of time amounts to nothing, and never have we lost out in the chest by shutting one of these machines down to clean it.

Clean stock results in a good many advantages. No trouble with pumps stopping up, nothing gets to your Jordans to rip out the fillings or plugs, and above all your chests are always clean. If you run one grade all the time and don't have to wash up for colors, you would never have to clean a chest.

The extractor will increase the capacity of any beater upon which it is installed from 200 to 400 per cent, depending upon the manner in which it is handled and the heat of the water employed.

The Sulphite Acid Plant

By O. L. BERGER

(Address Delivered at the American Pulp and Paper Mill Superintendents' Association Meeting on November 6, at the Congress Hotel, Chicago)

IT is no use to talk to you men about the theory or about the history of the sulphite making acid, but I will jump right into the thing and tell you what little I know about it.

I will divide up the process of making acid into four parts as follows: Combustion, Cooling, Absorption and Reclaiming.

The thing to watch out for in combustion of sulphur, of course, is to get a high percentage of SO_2 in the gas, to get it as free as possible from the acid and to avoid sublimation.

Now, the best way to do that is to use one of the standard makes of sulphur burner connected with a melting pot, which is not shown here, with a combustion chamber of ample size and with the proper regulation for air. In addition to this it is absolutely necessary to get away from the old scheme of having an acid maker tell, by the color of the gas, whether he has got a rich gas or not.

It is absolutely necessary, in my opinion, to have a recording instrument for telling the percentage of gas, and there is an apparatus on the market today called the Mono machine. I am not selling it, but I have seen it in operation and it is, in my opinion, the best machine on the market for testing the gas automatically. It gives you a record every few minutes for the 24 hours and you can always tell at a glance what you have been doing.

In addition to that I recommend in the combustion chamber a recording pyrometer. This is just as necessary as your other instruments. I think that the gas should not run less than 17 per cent, probably 18, but not any higher, because if you get any higher than 18 per cent you always have trouble in sublimation. I have noticed that whenever the gas runs up to 19 per cent you always have trouble.

The combustion chamber should be about 550 degrees centigrade. Some people run it higher than that and some lower, but in my opinion around 550 to 600 will give the best results.

You should not keep your sulphur outside. I have seen in my travels around the country, probably on account of the war, that quite a large number of mills stored up a great amount of sulphur outside in the open. When that is done you are bound to get a whole lot of moisture, and this moisture, in connection with your gas, is going to give you sulphuric acid, as you know. Be sure to store your sulphur indoors, where it will have an opportunity to dry out the excessive moisture present.

The cooling is done in the acid cooler, made out of hard lead. This cooling should be done as quickly as possible. You should avoid all long air-cooling pipes which are very common around the sulphite mills, and then hook your cooler as close to your combustion chamber as possible.

This would probably not agree with the opinion of some people whom I know. But I know from experience that these precautions will prevent the formation of sulphuric acid. The gas coolers should be about 25 square feet, 20 or 25 square feet of cooling surface per ton of sulphite for 24 hours. This gives you ample service, but that depends a good deal, of course, upon the condition of the cooling room which you have.

Now we come to the third part, which is absorption. We all know that the old way of making sulphite was by the tower system. After awhile they went into the milk of lime systems, and now again the trend seems to be to go back to the tower system. It is interesting to know that about 66 per cent of all sulphite acid in this country is made by tower systems and 40 per cent of all acids are made by the Jennsen tower system. This system uses reversible concrete towers, and I think it is fair to say that this is the new way of making acid, so I would explain that system to you.

Today there are about 53 of those systems in operation in this country and abroad. From the records of these systems it shows that the savings attained are so great that all of these systems have paid for their installation in 18 months and some of them as low as six months. The savings are mainly in less labor maintenance and the saving in lime and sulphur due to the simplicity of operation.

The last part which I want to talk about is the reclaiming. Now, we all know that it is easy to get a strong cooking for reclaiming acid if you have a good acid to start with, but I am sorry to say that in a number of plants I have had occasion to visit, even if they have a good acid from the acid system they do not get good reclaiming. It is my opinion that the acid really is made in the reclaiming system. It doesn't make any difference how good an acid you have and how little sulphuric acid you have, if you have leaky tanks in the period of reclaiming your liquor from your digestor you are bound to have trouble. It is, of course, necessary to cool your gases and your liquor. Some people are using side reliefs and some are not using side reliefs.

I have found that it is necessary to have a cooling capacity of about 20 to 30 square feet per ton of sul-

(Continued on page 631)

Casein

By HARRY L. DERBY

(Presented at the Meeting of the American Pulp and Mill Superintendents' Association, on November 6, at the Congress Hotel, Chicago)

WEBSTER defines CASEIN, "A proteid compound found variously in the animal economy, but especially in milk, of which it is a principal ingredient. When coagulated by acids or rennet it forms the principal ingredient in cheese."

There are many kinds and qualities of "Commercial casein," the term being used to describe practically every compound in which casein is the base. It may be of interest to some of you to know the usual method of extracting casein from skimmed milk, and I therefore will outline the two principal methods briefly, and without regard for technical accuracy.

The first method is that relating to the manufacture of acid casein, which is most commonly produced in this country. Fresh skimmed milk is run into a wooden vat and heated to approximately 120° Fhr. Commercial acid, either Sulphuric or Muriatic, is added at the rate of approximately one pint to each 1000 pounds of milk. The curd or casein is thereby separated from the whey, and the whey is drawn off, after which the curd is washed. The curd is then pressed to extract the water, and after being mangled or shredded, is spread on trays and dried in a tunnel dryer, after which it is ground and bolted.

The other method, the Lactic or Natural Soured, or "French" process which is used principally in Argentine, and very little in this country, owing to its high cost, differs from the Muriatic and Sulphuric acid process in that the skimmed milk is allowed to curdle by the formation of lactic acid, and without agitation. The curd thus manufactured by naturally souring the skimmed milk is handled as easily as that precipitated with Sulphuric or Muriatic acid and is not nearly so tough, nor so difficult to manipulate, or hard to grind.

Natural Soured Casein shows better strength and dissolves more readily and has better working qualities than the acid cooked casein, which when it cools has a heavy, short, viscous body and tendency to congeal. Acid cooked casein loses its fluidity, making it very difficult to mix well with color solutions when cold.

The Department of Agriculture determined by a series of tests that seven out of eight experiments showed casein made by the Natural Soured process to have the greatest strength, while the other test showed no noticeable difference. This view was adopted by the Bureau of Aircraft Production during the war, and accordingly during the period of embargo of imports, quantities of casein were admitted from the Argentine Republic to be used in the manufacture of aeroplane glue.

There is present approximately three pounds of casein in each one hundred pounds of skimmed milk, or to be more accurate, an amount varying from 2.9% to 3½%, depending upon the composition of the skimmed milk and the method of manufacturing and the extent of drying. There are a great number of uses for casein and there is not sufficient time to deal with the various grades and qualities used in different lines of industry or the various formulae and alkali required for different results. You gentlemen are principally interested in the use of casein in paper making, and I shall confine my discussion to that industry.

I know of no other commodity which may vary in quality so greatly without detection to the average user. The appearance will not enable even an expert to determine with any degree of accuracy the quality or strength of casein. It is an easy matter to ascertain the solubility of casein, but then again solubility does not necessarily indicate the strength or value of casein. The intrinsic worth of casein to the paper coater depends almost entirely upon the actual strength of the casein, and it requires elaborate tests to ascertain the strength. The user must therefore rely somewhat upon his source of supply to deliver casein adaptable to use, and having as nearly a theoretical 100% in quality and strength as is obtainable.

It is possible, with the laboratory apparatus in some of the paper mills, to make tests determining the relative strength of casein, but all mills do not have this facility. The general plan to ascertain the quality of casein is by its actual use on a coating machine. The requirements of the paper industry are more severe than almost any other line into which casein enters, and casein suitable for many lines of work, such as composition, paint, etc., would be wholly unsuited for paper coating. You all know that if an **insufficient** quantity of casein is used in your coating solution of Clay, Satin White, Color, etc., the coating "picks" and does not adhere to the paper. If the usual quantity of it is used, and this casein does not possess the ordinary strength, the same unsatisfactory results occur. You are familiar with the laboratory method of testing the strength or adhesiveness of your coating. As a matter of information to those uninformed, I am taking the liberty of presenting to you the adhesive or strength test for casein recommended by Mr. Arnold O. Dahl-

berg, of the Dairy Division, United States Departmetn of Agriculture:

"Fifty grams of casein ground fine enough to pass through a screen with 20 meshes to the inch is weighed into a casserole whose weight is known, 100 cubic centimeters of cold distilled water is added, the two mixed well and allowed to stand for a short time, when 90 cubic centimeters more of distilled water is added in which 5 grams of borax have been dissolved. Distilled water is then added until the mixture weighs 250 grams, and the casserole placed in a water bath having a temperature not to exceed 149° F. (65° C.) and stirred until the casein is dissolved. When the casein is completely dissolved more water must be added to take the place of that lost by evaporation, so that each 5 grams of the solution will represent one of casein.

One hundred grams of china clay or kaolin, previously dried at the temperature of boiling water for one hour, is weighed into a heavy casserole, and 70 cubic centimeters of distilled water added and mixed to a smooth paste, care being taken to work up any lumps that may settle to the bottom. After weighing the casserole with its contents of clay paste, 30 grams of the casein solution, representing 6 grams of casein, is added to it and thoroughly mixed with the paste. A stiff brush is helpful in getting a good mixture. A thin coating of the mixture is then applied to several small sheets of test paper by means of a thin brass scraper or camel's-hair brush, using care to spread uniformly. The casserole is again balanced and 5 additional grams of the casein solution added, the solution well mixed and another set of test sheets coated, continuing the procedure of adding 5 grams of the casein solution and making a set of test sheets until sufficient casein has been added to hold the coating mixture properly to the paper. Best results were obtained by using the brass scraper, which requires that the paper be placed on a perfectly flat surface, such as a piece of smooth plate glass. When using a brush the coating mixture should be painted on very quickly, first lengthwise and then crosswise.

When the sets of test papers having an increase of one gram in casein for each succeeding set are perfectly dry, a short stick of sealing wax softened by heating at one end is applied with a fairly firm pressure to various points where the coating is uniform, and allowed to cool. The paper is then held down firmly by placing the fingers on each side of the wax and the latter pulled away with a steady pull. In case of an insufficient quantity of casein the wax will pull only the clay mixture, but when sufficient casein has been used it will pull the paper fibers strongly to the edge of the wax, showing that the coating material had actually become a part of the paper. Usually a transition point is found when the center of the stick of wax will pull the paper fibers partially, while the next set having 1 gram more of casein will pull all the fibers to the extreme edge of the wax. A good grade of casein should not require more than 8 or 9 grams to hold strongly.

The strength of the casein as shown by this laboratory test bears some direct relation to the quantity of casein necessary to use in the practical coating work, and for that reason was used in determining the influence of the various factors observed upon the strength of the casein.

A simple test for the solubility of casein is the following:

Sample of casein taken shall be ground so it will pass through a 22-mesh sieve. Of this ground casein 100 parts shall be mixed with 400 parts of water and 12 parts of Crystal Boro Phosphate, or 15 parts of commercial Borax, the mixture heated by means of a jacketed kettle to about 160° Fhr. and stirred for 10 minutes. A perfect solution should be obtained by this method.

The actual results in the coating mill, after all, are the last analysis of the value of casein. In other words, the paper mill endeavors to buy the greatest quantity of adhesive strength in the smallest number of pounds of casein, and when it is considered that the price of casein sometimes exceeds 20 cents per pound, it can be readily understood how important the quality of casein is in the cost of the finished paper.

A user of casein may be misled in a casein solution which appears to have a good body and be high in viscosity—it may lack proper strength.

The working qualities of casein are dependent in no small degree upon the character of the solvent used. In order to obtain the greatest possible strength from casein it has been found that certain compounded solvents are more efficient than such solvents as Borax, Ammonia, Soda Ash, etc.

This has created a great demand for such casein solvents as Crystal Boro-Phosphate and other compounded casein solvents, which not only completely dissolve the casein, but at the same time free out the solutions and impart to the adhesive a long fiber, thereby eliminating brush marks and pin holes, sometimes found on surface coated paper.

Manufacturers of the higher grades of coated paper in which Satin White is used, frequently encounter difficulty due to the coating solution coagulating. This sometimes is caused by the combination of Sulphuric Casein with the Satin White, the base of Satin White being Sulphate of Aluminum, which is a Sulphuric Acid product. While Satin White may be neutral and work perfectly with Natural Soured Casein, if the Sulphuric Casein is used and the acid has not been properly washed from the casein, the excess of Sulphuric Acid present, when the casein is in solution, combines with Satin White and coagulation results. Additional alkali is required to overcome this condition.

It is by no means a simple task to manufacture a uniform grade of good acid casein. There is the pos-

sibility of the introduction of excess acid or failure to properly wash the curd, and in the manufacture of any casein, except the Argentine sun-dried casein, there is always the danger in drying, that too great a degree of heat will be applied and the casein scorched, in which event it becomes insoluble. Such imperfect casein is worthless in the manufacture of coated paper and is almost impossible of detection if it is ground to a fine powder and mixed with good casein. As the manufacture of casein, like other products, is dependent on the human element, it is safe to say that no creamery manufactures crude casein which is 100% standard. There are bound to be inferior batches containing excess acid, or others which are subjected to excessive heat, or insufficient heat in drying, and if this inferior casein is not graded out the purchaser will receive casein unsuited for his use. Some dealers having facilities for testing, grading and classifying casein have a market for casein which is unsuited for coating, and thereby are able to furnish a coating plant with the selected casein. Buying crude casein direct from a creamery is like buying "run-of-mine" coal, as compared to hand-picked coal, and paying the same price for the selected fuel as the fuel containing dirt, slate, etc. I believe you gentlemen are competent to protect your companies against the purchase of inferior casein, although in the operation of a coating mill it is difficult and expensive to carefully examine and test every sack of casein consumed. Due to the shortage of casein during the European War, many were attracted by the high prices prevailing in the casein market, and without possessing the required knowledge or experience, entered the business. Several have lost heavily, and the industry as a whole has suffered to some extent in loss of confidence on the part of the consumer. In the casein business, as in any other business, honesty of purpose and experience and expertness count for a great deal, and there is an increasing necessity for the casein producer and dealer to sell, in addition to a specified number of pounds of casein, service, which includes protection to the user against the purchase of an inferior product. It is surprising to note the number of users of casein who have no conception of the relative value of different qualities, and it is not infrequent that a grade of casein not worth within 5c a pound of the market price can be sold at ½c per pound below the prevailing price of standard goods. This is due to the fact, no doubt, that many concerns have failed to show proper interest in the study of the subject, so far as it relates to their business, and have been unwilling to spend money for the education of employees charged with the responsibility of the production of a standard grade of paper.

Of greatest benefit are associations and meetings of this character, where men in the same line of business may assemble and compare notes and discuss subjects important to the trade. It is indeed a simple matter to sell a standard article at a fair market price to those who know how to accurately determine the actual value of a standard article as compared to the value of an inferior product, and associations such as this are beneficial, not alone to the industry directly concerned, but are likewise helpful to the trades supplying the industry with raw material. Efficiency in manufacture of paper is regulated, first, by the qualities of raw materials available, and I think I may say advisedly, by the expertness with which those raw materials are employed.

(*Continued from page 628*)

phite, depending on the heat of the water which you are using. If you have very cold water—well water, like some mills are blessed with—you don't need that much cooling surface. At any event the gas and liquor coming back from digestors should be cooled down to about 30 degrees centigrade in order to get good absorption.

For reclaiming tanks I think the common wooden yellow pine tank, such as we generally see around the country, are as good as any. I had occasion to see the tanks over in Europe, made like a digestor with the bottom cone taken out, brick lined, made to withstand a very high pressure, and I venture to prophesy before very long you will probably be adopting this method, whereby the acid is preheated before it ever reaches the digestor, which, of course, will necessitate a different arrangement of tanks than those in use today.

There are two ways of absorbing the gas and liquors back to the system. One is by using a recovery tower entirely, and another way is by blowing the liquor and your gas down through the liquor in your storage acid and then have a small recovery tower on top where the gases from the top of your tank are taken back through. You pump your acid from the top of the tower and the gases are sucked up through this tower, and in that way most of the gases are absorbed and the excessive gases that are not absorbed in the reclaiming tower are then absorbed again back into your system. In other words the whole thing, the acid system, the relief from your digestor and your reclaiming tanks are all one big unit—all connected together. If those tanks are kept tight and you have no leaks in your pipe there is no reason why you should not be able to get your sulphur down below where the other fellow has got it.

Now, the operation of your side relief and of the cooking in general will probably be taken up by another paper at the meeting of sulphite men tomorrow, so I am not going to say anything about that.

But I want to emphasize to you men that, in my opinion, the acid is made in the reclaiming end, supposing that you have a good acid to start in with.

List of Cellulose Mills in Finland

Showing the Approximate Quantities of Cellulose Manufactured or Estimated When Completed

Since the world war is over and Finland has, as a consequence, joined the free nations of the world, she has come to the front decidedly, especially because of her position in the cellulose and wood pulp industries.

Our readers will be interested in seeing a map of Finland marked with the various locations of the cellulose mills in that country. You will find that, considering the capital, Helsingfors, on this map and the way the railroads in Finland are built, with the exception of one or two mills, the distance from the mills to the capital is about one night's run, and this has been one of the reasons why the Finnish cellulose and wood pulp industries have been able to amalgamate into two associations, which each sell all and every ton produced in these industries in Finland.

The Finnish Cellulose Union sells all the cellulose or chemical wood pulp made in Finland, whether its chemical pulp is used in Finland or sold for export. The same is the case with the Finnish Wood Pulp Union, which controls all the mechanical wood pulp.

This is really the first time that a nation has been able to control an entire industry for sale inside its own borders as well as for export.

On the map of Finland we have marked especially strong a mill named Enso which is now in the course of erection and will be ready in a few months. This mill will make at the start 30,000 tons of sulphite, but is putting up buildings to be able to produce 100,000 tons a year, and these buildings will be completed within the next few years. As this mill will be the largest in the world when finally completed, it will be of interest to our readers.

Key to the Map on Opposite Page

	Tons
1. A. Ahlstrom Osakeyhtio, Helsingfors, Finland	15,000
2. Borga Cellulosafabrik, Borga, Finland	4,000
3. J. W. Enquist Aktiebolag, Tammerfors, Finland	9,000
4. Aktiebolaget W. Gutzeit & Co., Kotka, Finland	30,000
5. Halla Aktiebolag, Kotka, Finland	10,000
6. Kajaanin Puutavara-Osakeyhtio, Kajana, Finland	18,000
7. Aktiebolaget Kaukas Fabrik, Helsingfors, Finland	19,000
8. Aktiebolaget Kaukas Fabrik, Helsingfors, Finland (Joutseno Sulphate Mill)	9,000
9. Aktiebolaget Kemi Osakeyhtio, Uleaborg, Finland	20,000
10. Lojo Cellulo saf abriks Aktiebolag, Lojo, Finland	9,500
11. Osakeyhto Nurmi Aktiebolag, Nurmi, Finland	3,800
12. Osakeyhtio Rauma Wood, Ltd., Raumo, Finland	18,000
13. G. A. Serlachius Aktiebolag, Mantta, Finland	10,000
14. Aktiebolaget Tornator, Imatra, Finland.	7,000
15. Aktiebolaget Walkiakoski, Valkiakoski, Finland (Sulphate)	5,000
16. Aktiebolaget Walkiakoski, Valkiakoski, Finland (Sulphite)	7,000
17. Diesen Wood Co., Ltd., Salmi, Finland	20,000
18. Enso Aktiebolag, Enso, Finland	60,000
19. Bjorneborgs Pappersbruk A/B, Bjorneborg, Finland	20,000
20. Aktiebolaget Ulea, Uleaborg, Finland	20,000
21. Kymmene Aktiebolag, Kuusankoski, Finland	10,000
Kymmene Aktiebolag, Kymmene Bruk, Finland	20,000
Kymmene Aktiebolag, Woikka mill, Finland	18,000
22. Osakeyhtio Jamsankoski, Jamsanki, Finland	5,000
23. Nokia Aktiebolag, Nokia, Finland	5,000
	372,300

The Enso mill will be so magnificent that we cannot fail to mark it with two rings on the map, but we have omitted to mark six or eight other cellulose mills being built or where companies are just being formed; their histories will come later.

KARTA
ÖVER
FINLAND
UTARBETAD VID
GENERALSTABENS LITOGR. ANSTALT
1918
BOTTENVIKEN
BOTTENHAVET
9·20
6
17
18
19
3
15·16
23
12
21
14
18
11
4·5
2
10
1·7·8

A Standard Container Board

By HENRY BERT, Chairman Box Board Committee

(Presented at the Meeting of the American Pulp and Paper Mill Superintendents' Association on November 6, 1919, at the Congress Hotel, Chicago)

THE new classification on corrugated cases, which go into effect on December 10, 1919, are, in my estimation, the first step in the readjustment of classifications on all fiber and corrugated shipping cases, both for the purpose of carrying freight as well as express shipments.

It has been a common practice among some of the mills and box factories to use just as cheap material as is possible to be used in fiber and corrugated boxes, and take the chance of getting by the classification inspectors with it.

The time is now at hand to bring this line of industry to a standard, whereby the man that is buying the boxes will get 100% efficiency, and on the other hand the manufacturer can realize a reasonable profit at the board mill and also at the box factory. The convenience experienced by shippers who use fiber and corrugated shipping cases raises this class of package above competition and puts it in a class by itself. Therefore, the man that is using the argument that the cheap box is as good as any other box as long as it conforms to the railroad requirements and classification is a detriment to the fiber and corrugated box industry. Poor material does not only stop that particular individual from progress, but it places a handicap upon the entire fiber and corrugated box industry.

I have always been of the opinion that the better we can make the box the larger the field will be for us to work in.

To bring this industry to a standard so far as quality is concerned, it is necessary to first secure a standard quality of board. At this time every mill has its own quality of board. Therefore, it is impossible to standardize in the quality of a fiber box. The classifications as they are laid down by the railroad companies will permit any grade of board to be used in a fiber box as long as the box conforms to the rulings of the classification.

I am of the opinion that a great many exceptions have been taken against the use of fiber and corrugated boxes for the carrying of certain commodities.

For instance, I will refer you to the packing of butter and cheese in cold storage. There are a few box factories who have succeeded in making a fiber box to meet those conditions, but this kind of a box cannot be made according to the railroad specifications. The 275-lb. test is not high enough; the board must test 400-lb. or better. It must be waterproofed to repel humidity to the highest degree. Of course it is not expected to stand such abnormal conditions such as being put into a water tank or subject to any other impossible conditions. These tests are very interesting as a demonstration, but the board must be and can be successfully made to meet the worst conditions that it can be required to meet by the Butter and Cheese Business. It can be done by putting the right stock into the board and sizing it properly to repel the moisture. This is only one illustration of the many possibilities for expansion in our industry if we but know what the other fellow wants.

Table salt is another commodity that can be successfully carried in a fibre box by simply putting the proper stock into the board and bringing up the water-proofed qualities. A container built up in this way will keep the moisture out of the salt and the salt will run free and not get full of lumps. On two different occasions a very good start was made in the manufacture of fibre boxes for both the Butter and Cheese and Salt trades. Then some fellow came along with a price-cut and, of course, the buyers of these concerns bit, with the result that they went back to wood boxes for butter and cheese and barrels for salt. That is why I contend that there will have to be separate rulings and classifications on some commodities in order to protect the consumer against fraud and at the same time protect the manufacturer of a good box against imitations.

There are several organizations working now to develop and extend the fibre box industry, but I think they can accomplish more if they will act as individuals and improve their own product. It does not matter how much representation they have to exemplify their goods, it is always quality that survives and carries the business to a successful termination.

Some methods used in the manufacture of fiber boxboard are very deceptive, as, for instance, when a four-ply board is being given by one manufacturer. His competitors can make a five-ply board out of cheaper stock, give the same thickness and just as high a test, and also maintain the same weight by loading the board with silicate of soda. This is another practice that should be discouraged, as it only lowers the standard of the industry.

Boxes made by this practice will give considerable trouble breaking where they are creased. They will get hard and brittle in a warm room and will get soft and peel off when they are subjected to moisture. My advice to the boxboard division of this organization

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Beating

By G. W. MERICLE, Chairman Beater Room Committee

(Presented at the Meeting of the American Pulp and Paper Mill Superintendents' Association on November 6, 1919, at the Congress Hotel, Chicago)

OF all the steps in the process of paper making, none is more essential to the success of the final product than that evolved within the walls of the beater room, and yet I am frank to confess it is my candid opinion that in methods of operation it is the most antiquated. We are still handling our beater rolls by "rule of thumb," relying on that too uncertain factor, the human element, to judge our beating processes, and we still expect uniform products.

It is an easy matter to accurately determine the percentage of Rags, Sulphite, Soda, Paper Stock, Size, Filler, etc., to be used in our various furnishes, automatic size-cookers and measuring tanks control our sizing, and yet when all is gathered together, how do we control the next and most important step—The Beating?

By the pressure of the rolls on the bed-plate, you say. Very true, but how is that controlled? This is the weak spot in the process. Only by human judgment obtained through years of experience is the pressure of these rolls judged—the hand on the wheel, the foot on the bed-plate, you all know the method.

It would appear to us that right here is the place where we can get together and use our grey matter in an effort to improve upon the present arrangements.

While proper standardization of methods of using the present equipment, especially the proper use of Jordan engines in the preparation of stock, will help considerably in bringing down the costs and in bringing up the quality, it will by no means alter the fundamental principles—the equipment itself—it can at best assist us only to a certain extent, in increased efficiency. There are many mills that I know of, especially since the advent of the cost system, that have standardized beating operations, but none of them have produced anywheres near the amount of good expected; they have attempted to install an up-to-date high powered motor to a springless cart, and have achieved about the same results.

This standardization of beater room methods has accomplished many very good things, however, which should not be overlooked and for which the cost system should be given credit. If it has done nothing else but bring the paper manufacturer to a point of realizing the enormous waste of power that is going on in his beater room, by the use of the heavy, ponderous equipment of today, it has surely accomplished something worth while.

The paper mill chemist has not given the material assistance in beater room management that had been expected of him. He has revolutionized none of our ancient processes and we still work by "rule of thumb" almost exclusively in our beater rooms. In fact colloidal chemistry is still in its infancy, and of course paper making is colloidal chemistry. The "hydration" of cellulose is still an unknown quantity to them. The absolute control of such matters as density, fibre length, slowness, beating and jordaning has not as yet been explained or reduced to a numerical value. The chemist who is working along this line and who studies his problem, not only from the point of view of the equipment now in use, but suggests the necessary changes in the mechanics and hydraulics of the present equipment, will be doing a work of incalculable value to the industry.

I know that several of you gentlemen have worked out a pretty fair system of beater room control. You have prepared working charts for the guidance of your beater rooms, installed ammeters on each beater and Jordan engine, figured out the speed and time factors and their relationship to the stock, have certain specified marks to which your roll should be lowered after certain specified periods, and have worked out the true relationship of the Jordan to the finished stock. But you must agree with me that there are many opportunities for improvement in the equipment we are using.

I want you all to collaborate with your Beater Room Committee by sending in your kicks and suggestions to us. This will permit our compiling some data for the machinery manufacturers to be guided by. They will then be enabled to fulfill our needs, as they will know exactly what we want.

Greater production is the cry of the day, in our industry as well as all others. To accomplish this in a manner really worth while, means not to work harder or for longer hours, but to make our present equipment do more work with less human effort, and if we cannot increase the output of our present equipment, we must plan to equip ourselves with machinery that will give us greater production with less expenditure of power and labor.

Make a thorough study of your methods and see if you are getting all that your machinery is capable of producing out of it; if not try to find out what in your opinion is the trouble and then report your findings

to the committee. I am sure we will accomplish something worth while.

Permit me to read to you at this time a letter written by one of the members of the Beater Room Committee, a man who stands high in his profession and who is recognized as an authority on paper mill affairs:

"My opinion is that the best machinery on the market at the present time for refining stock is fifty years behind the times, being all out of proportion, great power and labor consumers, and one of the largest factors in the high costs of paper manufacture.

I believe that improvements for machinery of this kind have been neglected and given less thought than any other machinery in the world, and believe it should have more attention and thought, so that a better product could be manufactured at a greatly reduced cost; a large saving in steel, iron and fuel; and a great reduction of labor. I sincerely believe this machinery should be developed to a point where it can be set to do the work automatically. Only in this way can the best results be obtained at any given time so that a strictly uniform product could be produced by typewritten instruction charts for handling the machinery. The present crude way gets fair results, but I figure that a man's fingers and thumb are not as efficient as a ratchet and dog.

Let us all get together and give this part of the mill a little study and formulate our views, then submit them to the paper machinery builders, they are the boys who will try and give us what is needed; but before they can do this they will have to know just what we require, because they cannot set their hydraulic and mechanical engineers to work unless we tell them what we want. We must start immediately or we will have to drift along in the same old rut for another fifty years.

I wish to add that the best of our mechanics at the present time seem to be giving all their attention to aeroplanes and automobiles. I do not know positively, but I think that the remaining best men are riding in them, and doing nothing but just breathing and pulling down the money. We must turn their attention to refining machinery and present them with all the ideas we can develop and suggestions for its improvement. We will then make it more profitable for our firms and less worry to all concerned."

This letter was written by a representative of one of the few mills in the country which does not need a salesman, its paper being made so that it talks for itself: Mr. W. C. Nash of the Lakeside Paper Co.

He expresses exactly my own ideas on the possibilities of improvement in beating machinery, and it is my candid opinion that this is a subject too large for a small committee alone, but should be given the support of the Association as a whole, as it is worthy of our earnest thought and consideration. If we will all get together and really try, I am confident that we can develop some decided improvements on our present method of operation. Let's try.

(*Continued from page 634*)

is to get into personal contact with the box factory; there is the place to ascertain what kind of board is necessary to produce a high-grade box that will be both satisfactory and a credit to the industry.

I spent nine months on the Pacific Coast in 1918 and found empty boxes that had carried freight from the central states to California, and they looked good enough to be filled again to ship back to the central states; while, on the other hand, I am sorry to say that there were many that did not arrive in good condition and that the inferior box was much more in evidence than the good one.

There has always been a question in my mind why the fibre box was not accepted for export shipments, but after looking this situation over at the seaboard it was very simple to see the reason why. When all mills and all box factories get the quality of the product at par, then the fibre box will be able to compete with the wooden box in export trade.

One thing I noticed in particular at the wharf at San Francisco was two large ocean liners being loaded with general merchandise. I saw good fibre cases opened and the contents were put in wooden cases and in my opinion, the wood cases were not as good as the fibre cases that were discarded. But they were wooden boxes, and that is the only box accepted by the export ruling. There was also a consignment of fibre boxes on one of those liners going to Sydney, Australia. I hope they were not the inferior kind, as that would not do our industry any great good, but set it back a number of years. It only takes a few demonstrations of this kind to wake you up to the possibility of what can be done by producing a better and standard fibre board.

In connection with the manufacture of fibre box board, it should interest the sulphite men in this organization to know that there is a very large tonnage of sulphite used in container board. This will give you an outlet for your No. 2 sulphite pulp, as that will answer the purpose just as well as No. 1 sulphite for a container box board. This No. 2 grade furnishes a market whereby you can take all of the culled wood that is now going to the furnaces and convert it into a marketable product. Of course, it does not bring as high a price as the No. 1, but it gives you a chance to clean up your wood yard and save that shrinkage.

I now solicit the co-operation of all the superintendents in the box board and fibre box industry to work for a better grade of fibre box board to insure a better fibre box.

Motor Driven Grinders in the Manufacture of Ground Wood Pulp

By J. E. MULCHAEY, Chairman Ground Wood Committee

(Address Delivered at the American Pulp and Paper Mill Superintendents' Association Meeting on Nov. 6 at the Congress Hotel, Chicago)

BY vocation and training I am a paper mill man, having entered this profession at the age of 11 years, and I have been at it ever since. About 16 years ago, while I was at the Flambeau Paper Co., I got an idea into my head that the only way a paper mill man can succed in making good paper is to know all about the materials that enter into his product.

At this time, as I am at the present time, I was engaged in the manufacture of news print. I therefore decided that it was up to me to make a study of the pulp used in my paper, both the sulphite and the ground wood, and as I have been requested to talk upon the latter, I will try to confine myself to that particular subject.

You are all well aware of the fact that in almost all of our large paper mills the ground wood proposition is far away from the paper mill superintendent; in many mills they do not manufacture any ground wood, while in others they have a superintendent in charge of the ground wood pulp mill to whom the general superintendent leaves the question of the kind and quality of pulp to be made.

While there are undoubtedly many good pulp mill superintendents who produce the exact quality of ground wood that the paper mill man wants, there is no doubt that the man upon whom is placed the responsibility of producing a good sheet of paper should know and have something to say about what kind of ground wood pulp will make the best paper with the least amount of trouble; any way, that was my conclusion and I went at it on that basis.

The manufacture of ground wood is not conducted according to any fixed standards of practice. As each pulp mill superintendent has his own ideas about the methods that ought to be used in grinding wood, the results obtained by any two mills differ so widely that there is hardly any comparison. No two mills use exactly the same speed, power, stone surface or temperature. It is no wonder, then, that the product varies so widely in quality and cost of production.

Many of the figures on power consumption are evidently inaccurate, as it is well nigh impossible to estimate with any degree of accuracy the power consumption in a water wheel driven pulp mill. In regard to the quality, the same discrepancies are evident and are solely judged from the point of production and not from the point of paper manufacture. It therefore behooves all of you paper mill men to learn all you can about the pulp end of your business so as to permit your giving definite instructions in regard to the exact quality you need to make a good sheet of paper.

While I was running the paper mill I went into the pulp mill and familiarized myself with the methods used in its manufacture until I was pretty well conversant with the situation and then began a series of experiments to find out what the best ground wood for newsprint was and what were the conditions that would produce that pulp uniformly.

They had eight grinders in the Flambeau plant at that time and after thoroughly familiarizing myself with pulp manufacture I had the pulp superintendent work according to my instructions.

I had the pulp superintendent sharpen the stones only when he was instructed to do so, and wash the pulp only in the way I had instructed him to do, and as I spent considerable time in the pulp mill it was an easy matter to keep track of things and see that these instructions were carried out. The result was that quality of paper we made was increased considerably and that it was very uniform.

From the Flambeau mill I went up to Grandfathers Falls, where the grinders that I am going to talk about today are installed. While electric power driven grinders are not new to some of you, they were at that time something new to many of the mills, and as I have made a very thorough study of their efficiency in comparison to the water wheel driven grinders I feel fully qualified in saying a few words about them.

The grinders, as you all know, are the largest consumers of power in the mill, and as you also know that with water wheel driven grinders you waste power, and that power means dollars, you will appreciate the fact that by using motor driven grinders you are saving power and therefore saving money. In addition to this you have the advantage of placing your grinders in a convenient place in your mill instead of placing your mill in some place convenient for the grinders.

There is one thing that I wish to particularly call your attention to about motor driven grinders, and

that is that you must keep your stones perfectly true. We are running our stones at 262 revolutions per minute with a 450 h. p. synchronous motor in connection with grinder regulators. You must remember that water wheel driven grinders are not running at that high speed and therefore it is not so important to keep them true.

I am producing a good grade of 32-lb. news with not over 18 per cent of sulphite from ground wood produced at the rate of 62 h. p. to the ton with our motor grinders, and while there may be some of you who can get it lower than this I do not think you can do better for the same quality of sheet.

In grinding with water power there is an enormous waste of good power and it is almost impossible to produce a uniform pulp because every time you take off a pocket your stone runs away, you have a variable speed all the time. You are using the water all right but you are wasting the power and making poor pulp except when you are using the three pockets on your grinder, and as you have to fill them once in a while you cannot help but waste the power and make the inferior pulp because every time you take a pocket off your stone is bound to race.

With a motor driven grinder you can regulate your power so that you will always run at a uniform speed. When you take off a pocket the other two pockets are only consuming sufficient power to do the work; the regulator takes care of that.

If it was only for that reason alone, the saving of power, I would say that motor driven grinders have not only come to stay but that they will in a short time supersede the water driven grinders entirely. I don't care how small the water power is that you control, if you are driving your grinders with it you are wasting power, while if you generate current with that power and then apply it to your grinders by means of the motor drive you will be getting 100% efficiency in power application and produce a better pulp at the same time. With the motor driven grinder you do not vary the speed of your stone by more than two revolutions when you disengage a pocket, while with the water wheel driven grinder your stone will race for four or five minutes every time a pocket is filled.

About ten years ago, if a superintendent said, "We should grind our wood by electric power," he would have been thought foolish or extravagant. But now when everyone realizes that we must conserve all forms of energy whether it is in the form of water power or otherwise, it will be easily apparent to you that the only way to get the full value of all the small sources of power at hand is to convert it into juice and apply it to a motor driven unit.

If any of you gentlemen install the electric driven grinders I would suggest that your installation be for a speed of about 250 ft., as I believe that is the ideal speed.

As regards the output of our plant, I want you to bear in mind that we are making ground wood to be used in our own paper; we do not sell a pound of it outside. If we were making pulp for sale of the same grade that is generally met with, we could increase our output considerably. We don't sell pulp, but we do sell paper, and we try to give the consumer the best quality of newsprint we know how.

There is one more phase of this subject that I wish to take up with you before I close and that is the consistency of the pulp under the stone. There are many of you here who believe the pulp under the stone should always be thick and claim that it keeps the stone clear. I do not believe that is quite true if you are using a three pocket grinder.

I may be wrong in the conclusions I have drawn after many experiments, but I found that we could not get as good results with hot, thick pulp going over the back as when we run our pulp rather thin. Our pulp is much superior to the pulp made the other way, no matter what paper it is intended for.

You say that you keep the stone clean in that way. Maybe you do. But it seems to me that your pulp is a little bit burnt and is a slow pulp on the paper machine. It is what I would call a burnt pulp and very low in strength. I have tested this out a number of times and always got the same results.

In regard to temperature, in the winter time I use white water over it, to keep the pulp warm, while in the summer time I use cold water; in that way I keep a pretty uniform temperature. We have put one board back of the grinders so as to assist in its flowing right over and we never have any chunks.

You may think that I am rather positive about my assertions, but as I have been making a study of ground wood and conducting numerous experiments with wood grinding for the last 16 years, the last six of which were spent with motor driven grinders, I feel that the results I am getting on my paper machine are the result of a good ground wood pulp.

I want to say to you gentlemen in closing that through the courtesy of my employer, Mr. William J. Sullivan, you are invited to visit our mill at any time and its doors will be wide open to you. I will give you the key and let you go through, stay as long as you like, and answer any questions you may ask.

We have no secrets, although we do make a pretty good sheet of paper.

Proceedings of the American Pulp and Paper Mill Superintendents' Association Meeting on November 6-7, 1919, at the Congress Hotel, Chicago

Thursday Morning Session, November 6, 1919, at 10 o'clock a. m.

President Fred C. Boyce, Presiding

THE First Annual Fall Meeting of The American Pulp and Paper Mill Superintendents' Association, held at the Congress Hotel, Chicago, was the most successful meeting that has been held by any organization identified with the paper industry in many years. The attendance was truly representative of every paper-making section east of the Rockies, but exceeded all expectations in point of numbers present. That an organization barely six months old can hold a meeting during the busiest period in the history of the industry and right in the middle of a coal strike to further handicap the attendance and still can draw an attendance of paper and pulp mill executives, proves conclusively that the Superintendents' Association is performing a very important function in the industry.

The President: Members of the American Pulp and Paper Superintendents' Association: I have the pleasure of introducing to you Mr. Phil Grau, who will tell us about Chicago and what they can do here.

Mr. Phil Grau: Mr. Chairman and gentlemen: Your Chairman's introduction was consistent, to say the least. When Mr. Spangler of the Convention Bureau of the Chicago Association of Commerce, of which I am a member, rung me up and asked me if I would come over and make an address of welcome he said, "Make it short." I can't think of anything shorter than that in introducing a man. If you can, I wish you would tell me.

It makes me think of a story Senator Spooner told a few years ago. He said the greatest speech of introduction he ever got was here in the northern part of Wisconsin. I think it was up near Wausau somewhere—I don't know but what this might have been the same man, only this man hasn't got a German accent and the other man had. He said there was a little German got up one night to introduce him and he said: "Ladies and gentlemen, I have been asked to introduce to you Senator Spooner, who will make a speech. I have done so and he will now do so." (Laughter.) If brevity is the soul of wit, that man was the wittiest fellow I have ever heard of.

As I walked over this morning from my office, Mr. Huber, of the Convention Bureau of the Chicago Association of Commerce, having called me, I wondered what I could say to you that was really up-to-date in the line of welcome, to welcome you to Chicago, to this convention, and I found, all unconsciously, as I came down Michigan boulevard, that my brain had fallen into the spirit of the time, evidently, and joined tne union and gone on a strike. At any rate, it did not deliver 100 per cent efficiency on the way across. I know that. But when I got here and found everything set and everybody ready to listen, which is so different from the average convention—you generally get here and you sit around until 11:30 or so, then there are about ten men sitting in the chairs and the president starts the meeting and you start to talk, and before you get through they are all in and you don't know whether you have said anything or not. So, this is a rather unusual experience in Chicago, and I am very, very glad to recognize that fact, so far as your general organization is concerned, because when a crowd of fellows will come from all parts of the country, as I understand you fellows have, and will be here on time to start a convention, I can almost bet you are going to do something before you finish, because that in itself is an elegant characteristic.

I don't know that I can tell you much about Chicago. As a matter of fact, I don't know whether you want to know much about Chicago. What you don't know won't hurt you and what you do know you have heard so often that it would only be perhaps a matter of useless repetition to try and hammer it home again.

But there is one thing I think I can tell you, and that is that there is no city in the United States that feels more hospitable toward your organization and other similar organizations, so far as your coming here to hold conventions, or your coming here at any other time is concerned, than our own beautiful city here by the lake.

The Chicago Association of Commerce plays an important part in this town. In fact, it is one of the big organizations where we gather with what we familiarly, and, I might also say, interestingly, refer to as the big fellows, or "whales" of the town. Of course, once in a while they get a little minnow like myself, but we have got an awful lot of whales in the Association of Commerce, not because they spout, but because they do big things in a big way. Consequently we have accomplished something in that organization for the city and for the nation. One of the big things that we are keeping in touch with today, so far as the public is concerned, that will be of interest to you, is the one underlying question of production in the United States, the question that is known as the question between capital and labor.

I am not going to make a speech on that question today, not for one moment, because I am going to make this short. But I do want to call your attention to this: No matter what your program may be here, no matter how many problems you may have to outline and discuss and consider in your own plans that have already been outlined by your convention committee, there will be no doubt time to give some little consideration and some little thought to the fact that underlying all of our unrest in the country today is the fact that certain misleaders of labor have made men think that the less they produce the more men they can put to work and the more money they can make for themselves, irrespective of what happens to the United States at large. Just so long as you and I, just so long as your city or your association or your particular town, or Chicago, here and now, allows that thing to go on uninterruptedly, just so long will we be standing still in the one big basic problem of our industrial unrest.

No man has a right to tell you or me that we must join a union or that we must stay out; but every man, every man-

ufacturer, every citizen, has a duty to perform in this direction at least, that every organization, whatever it may be, labor union, manufacturer or otherwise, sees to it that that organization is used as a constructive organ and not as a destructive one in the United States, and until the labor unions learn that lesson, until the labor unions and their misleaders act differently than they are doing today, we will continue to have industrial unrest.

There is no question but that you will discuss the labor problem at this meeting, as it is of such vital importance that you cannot overlook it, and I sincerely hope that you will give it some consideration and act upon it when you go home in the direction of solving the matter of production, because if we can get men to work, if we can get them to see that their union cards mean something more than a mere passport so that they may go about without getting hit on the head with a club in times of strikes; if you can build up production and get men to give you 100 per cent efficiency on a full day's pay, then you are striking at the very root of the unrest that we have today, and of high prices and of everything else, at least, as most of us have been able to see it, by and large.

But there are other big questions in the country that also concern you. There is the question of railroad legislation; and other legislation. You know, we have on our statute books the beautiful piece of mislegislation known as the Sherman law. It wasn't long ago that if two or three men got together to discuss selling peanuts they might be indicted for that. Why was it done? Because it was passed at a time when there was a public demand for it. That time has gone by, but the law still remains upon the books and you gentlemen, you and the men of industry that you represent, together with all other lines of business, must see to it that laws of that kind are not allowed to remain, and better still, are not allowed to be put upon the statute books in the first place.

Let me leave one other thought with you, and that is this: No matter how black things have looked in this country from the very day we first won our independence, we seem to have, somehow or other, a happy spirit of getting together on the right basis at the right time and winning out, no matter what the problem might have been. And so, today, in the industrial unrest that we are going through now, in the crisis, if you please, that we are going through now, stop and consider how we were all penned up for several years and then think of how all at once, when the lid went off, everything blew up, lid and all, and you will realize that it was only natural that we would have unrest; it was only natural that the fellow who was on the bottom a long time, when he got on the top would try to do the things that he thought he would do when he was the under dog if he ever did get on top. It is only natural that we have the pains and aches, but they are only growing pains and we are going to get over them all right.

I don't have any fear, and I don't think you have, that this country is ready yet to give an illustration of how to go to the devil. We are going to keep our feet on the ground. We have got to win out. We want to examine every proposition that is laid before us, like the Plumb plan for handling the railroad situation, for example. We have got to examine it, take it apart, see what it means; whether there is a bolshevik element in it or whether it is based on common every-day horse sense, and, if we do that, we are not going to go wrong, because we are going to go forward in the right direction.

Now, there is one question I would like to ask you, and I don't want anybody to answer. I would like to ask how many of you know what Congressional District you live in and who your congressman it. I don't want you to answer it because there are too many who will probably be embarrassed. I was very careful to look it up myself before I put that question in a convention.

Why should you know that? Because we have got to depend upon our representatives for the laws that are made to guide us. The laws are made by our representatives in Washington, D. C., and yet we don't know, most of us, why we vote for a man, what district he lives in, what he will do; and we don't even take the trouble most of the time to tell him what we think he ought to do. We may vote for him because he was or is, a democrat or republican, because our grandfather was a democrat or republican. Then, if things are done in Washington that we think ought not to be done, the first thing we ought to do is to kick ourselves around the block, because we are to blame. You and I are the government in Washington, and no one else.

While you are talking and thinking of that, and I can say this with a great deal of justification because I happen to be a member of the bar myself, for heaven's sake get fewer lawyers in the Congress. They are a necessary evil from a certain angle, I will admit. You have got to have lawyers in Congress in order to shape legislation so it will be constitutional and go through the courts, but when it comes to the meat and potatoes, you want common every-day hard-headed, horse-sense business men down there to say what is to be put into laws. You must also have some real big men to run this government, because running the government of the United States, gentlemen, is a great big business proposition; it is not any child's play.

When you find a lot of men down there who cannot make $8,000 a year on their practice at home and therefore like to go to Congress, then you find men who don't know the first thing about business principles; when you find men who are running for office because the citizens are not taking a proper interest in their right and duties as citizens, you cannot expect any other results than what you are getting from the house upon the hill at Washington, D. C.

Now, don't think I have a quarrel with everything in Washington, because I haven't. We have got a good many men down there who are capable and bright, that is true. Don't let's overlook these good fellows who are capable and honest. But we want more of them. We have got to have plenty of them down there, so that you don't have to round up these fellows every once in a while and squirt an idea into them with a hypodermic syringe.

I am almost sorry that I am only here to make an address of welcome, because my time is almost up, but I want to leave this thought with you in welcoming you to the city of Chicago: that we are glad to have you here, not only because you represent the paper industry; not only because you come here to consider your own problems in our midst and endeavor to solve them, but because we know we have in you of this convention a force that can go back through the ramifications that it represents in the United States, through the various firms and corporations and partnerships with which it is allied and in that manner can aid in solving this great big problem that we have before us of keeping our brains cool, our nerves steady, our feet upon the ground, and our thoughts along the nobler and the higher and the better things. And when men get together like this in times of peace to consider their own questions, we know that they are not going to fall down on the bigger problems and fall down on the bigger questions of the day which it is also their duty to take part in.

Therefore, gentlemen, in behalf of Mr. Merrick, the president of the Association of Commerce, in behalf of its Board of Directors, in behalf of its 6,000 members, I want to welcome you to these deliberations which you are going to hold here. So far as it is in our power we will hand the city over to you. You can do what you please. You can have all kinds of fun here. The only thing you can't get now is what you couldn't get anywhere after the first of July. They say there are places where you can get that. But, being here to tell you how to stay within the law rather than avoid it, I can't give you any directions. (Laughter.)

I thank you, gentlemen, for this opportunity of talking to you a few moments. I sincerely hope you will enjoy your visit. If there is anything you don't know how to do, if there is any assistance that headquarters can be to you over here, call up Main 4808 and tell them and they will have somebody here to help you out, without doubt.

I welcome you to the city. I know you will enjoy it because everybody else does, and if you are half as glad to be here as we are to have you here, you will have one of the most pleasant times you have ever had at a convention anywhere in the United States.

Mr. L. E. Blackmer: Mr. Grau, in behalf of the American Pulp and Paper Mill Superintendents' Association, I thank you for your welcome to the City of Chicago.

I wondered when you started to speak; I was brought to think of the old story of the whaler that came to my ears a few years ago down east. He had been giving some instructions to a new man on the harpoon gun, and in his quaint old Yankee way, he says: "Remember, boy; don't shoot the harpoon until she begins to blow, but when she blows soak it to her." (Laughter.) I thought in the beginning when you mentioned the Chicago Association of Commerce as the whale that possibly we would have to get the harpoon ready, but I see that it is not necessary.

We are very glad to be in the City of Chicago. We are very glad to gather here upon the occasion of this, our fall convention, our annual session, and I am sure that there are many interesting things for us to behold in the City of Chicago, possibly many attractions to learn of, but those will all come during the process of the course of these sessions. I suppose that a few of them further north, perhaps Monaghan and Kelly—I can only speak for the delegation up in our section—found some of those attractions already. They are pretty keen at that sort of thing (laughter) and I am sure that as time goes on the balance of the delegates will be able

to locate themselves geographically so that they will encounter no hardships.

In regard to labor problems, I wish to say we have had some of our own that have proved to our satisfaction that this thing can find its solution in getting together and discovering the other fellow's problems and the other fellow's difficulties, threshing them over coolly, and calmly expressing your viewpoint, with the result that calm and peace will take the place of turmoil and conflict, and I am sure that if there are any pains such as have been mentioned this morning that, by the gentleman from the Association of Commerce and been pains in this organization, that they are only growing pains, and from the size of this body gathered here this morning, I feel that those growing pains have been mighty, mighty well suffered, and I only hope that as this organization continues on to the meetings of the various divisions, and to its next annual session, that we will have more of these same growing pains, so that at the time of our next annual convention, perhaps in the city of Chicago, this room will be filled with delegates to the American Pulp and Paper Mill Superintendents' Association.

I believe that we have several big problems to thresh out and I think that the time is coming when we will need and want, just as we do today, only in a bigger way, the hearty co-operation of every one in the industry; and, gentlemen, I feel certain that this time is coming, and that when we gather for our next meeting that there will be a sprinkling of managers from the different divisions of the mills represented in our body of delegates. There is no reason why this thing which has been growing over this short period of time to the size it has now attained, cannot become one of the big factors that will promote production, that will promote a better spirit and better feeling in the industry at large, and that will increase the quality of our product, due to the splendid discussions that we hear at these sessions.

So, I say that we welcome Mr. Grau this morning and his splendid message to us of welcome to the city of Chicago, and we hope that we can carry out in just as big a way as he has suggested the plans of these sessions.

Mr. Grau: I know it is unusual to reply to a reply, but I cannot help but remark that in the twelve years of experience I have had in doing association work I have never heard a reply to an address of welcome as good as that one. Gentlemen, if you carry out the spirit of your work as the spirit of the reply was presented, I have no doubt but what you are not only going to accomplish what you are here for, but you are going to grow in leaps and bounds beyond imagination.

I have just one story before I go that I would like to tell you, and that is this: The Rotarians, you know, have a little word which is their watchword. It might be a good one for all associations to adopt. It is the little word "service," and the story I want to leave with you, if some of you have not heard it, was published in a Saturday Evening Post some two or three years ago. The story of the colored man who was over in the trenches and was very anxious to get into action. They were waiting for the whistle to go over the top, when he went up to the captain and says: "Cap, I can't stand in line here much longer. I wants to get over the top of these trenches and do something. I'se going to get up on top of that parapet and I'se going to dance a jig." "Don't you do that, Sam; the Huns will get you sure." "Oh, I ain't afraid of the Hun bullets; what does I care for the Huns?" And before they could stop him he was up on the parapet dancing and calling out, "Come on, dere, you Germans, get busy; I'se jest wasting away and pining for action. Shoot over a few bullets; I eats them before breakfast. For heaven's sake get busy." Just then a great big shell struck near him. There was a shower of dirt and dust and splinters and everything else, and as the smoke cleared away they found a little mound up there in front of the trench and they jumped into it and found a toe sticking out of one end. They immediately dug into the other end and took him out and the captain said: "Well, Sam, you wanted action; I hope you are satisfied." He said: " 'Fore God, boss, you certainly do get service over here." (Laughter and applause.)

The President: At Wausau and Green Bay, and every time—I have received a letter from Mr. Massey. He has been telling me how he was going to publish what I said here in the paper, so I have written it down because I was a little bit leary of getting mixed up.

(The President then read his address, as follows):

Fellow Members of the American Pulp and Paper Mill Superintendents' Association:

I am very glad to welcome you to this our first meeting at Chicago. While we have had several meetings of the different divisions at Kalamazoo, Green Bay and Wausau, this is the first meeting devoted entirely to business of the National Association, and, if the meetings held before are a guide to go by, I am sure you will all have a good time here and you will be much benefited by your two days spent in Chicago. I think it is a good thing for all of you to get away from the mill and relax for a short time, and, as one paper mill manager told us at Wausau, we came back with more pep and by our talks together on different subjects were made better men for the company we were employed by.

While at Chicago some six weeks ago attending the Technical Association, of which I am a member, several of my friends asked me about this association. They had been asked to join, but were in doubt about it, as they had heard that we were organizing a superintendents' union, and by inquiry I found that a good many were under the same impression. You all know that nothing of this kind has ever been talked, or even thought of. I can only give you my personal views and call your attention to the subjects we have discussed at the different meetings held in regard to the character of our organization of the superintendents.

In the first place, I think it is time the superintendents took their proper place in the paper industry. Next to the manager, the superintendent is the most important man at the mill, and many times in the absence of the manager the superintendent has to decide many things that come up unexpectedly that cannot await the manager's return.

Second, the paper and pulp mill superintendents are men who have come up from the ranks, and are not college men, but are educated along practical lines. While we all make a hobby of paper making, many of us are not posted in the way we should be on other things, and these meetings are going to bring out as much of this side of a man as the talks on the paper making part of it are.

Third, and probably the most important part a superintendent has to play today, is between capital and labor. As our friend Massey has very ably put it, "the superintendent is the keystone to the arch," and while a superintendent is always loyal to the company he is working for, at the same time he has a moral and should have a vital interest in the people working with and for him. The time is past, and, I hope, never to return, when any man can say he has only himself to look out for. You, the members of the American Paper and Pulp Mill Superintendents' Association, have from 100 to 1,000 employes working for you, and I want to tell you that a kind word here and a kind act there makes for production, and a good loyal bunch of fellow employes is the finest asset any company can have. If this thought is carried out, and I know many of you are doing it, I think, at least, that some of our industrial unrest will be eliminated.

I am not here to talk paper and pulp making to you. You, the members, are to do that; but before we start on the business part of the meeting I would like to hear just a word from each of you. Tell us who you are, and what company you represent, and the place you come from, and I am sure we will then all be better acquainted.

The President: Now, I want each man here to get up and introduce himself to the delegates so that we may all know each other.

(The delegates then one by one arose and gave their names and the name of the company and the place from whence they came.)

The President: Now, I know all of you fellows didn't know each other before. You know, up at Warsaw, we had a business meeting and we acted kind of strange, and then we started in introducing ourselves. You know, it put the pep right into the meeting and we had a fine time from that time on.

I want to appoint a financial committee to look over the books and report some time tomorrow, and I am going to appoint Mr. Ed. T. A. Coughlin, Mr. Paul Smith and Mr. Dan Davern. They can consult with Mr. Massey and we will see how our finances are. It may surprise some of you that a new organization has any finances, as in most cases at this point in their development other bodies have nothing but debts, while we have cash in the bank.

I am also very glad that we have with us some fellows here from Canada. You know, we are kind of nuts, as a fellow says, on this Superintendents' Association up in Wisconsin, and we hope you fellows will have enough pep to get a little nutty about it, too.

Mr. O'Connell, Chairman of the Sulphite Committee, who delivered a paper in Warsaw which you probably all have read and will undoubtedly concede it to be a masterpiece, is in town but has not as yet appeared; and as this committee is the first committee to report we will leave that open until he arrives.

The next committee to report is the box board committee, Mr. Henry Bert, Chairman.

Mr. Henry Bert: While I have a short paper to present to you, I would first like to suggest to those who came to this

meeting that they should get in touch with their friends so that we can bring more strongly to the attention of the superintendents in the box board lines the importance of this organization, and, by all means, the importance of these meetings.

This is the first good representation that we have had in the box board line and the only thing I can say is that if all those present work for the interests of our organization we will have to hire the Coliseum for our next meeting.

At the previous meeting at Warsaw I intended to deliver an address in person, but at the eleventh hour I could not be there in person, so I sent a paper and Mr. Massey kindly presented the paper to the convention at Warsaw, and from the correspondence I have had it seems to have met a need. I have partly prepared a paper for this convention but I have been so busy that I could not get around to it and also found that a man could not do it twenty-four hours ahead and keep up-to-date; things are changing so rapidly and so fast that I didn't know just what would be the proper thing to say, even if I had the time. So I will start with a few notes that I have made and then attempt to cover as many points in the manufacture as possible in our meeting of board men tomorrow.

One of the difficulties in regard to standard boards is the salesman's proposition. The first thing that enters the salesman's head is to get business and in 99 cases out of 100 he wants to get it on price. He leaves the quality and the class entirely out of the situation and plays on getting the order on price. That is one thing that the superintendent never comes in contact with. The salesman gets up and sizes up the other fellow's goods, boxes, paper or anything else, and he wants to get that business. He goes back to the mill and he will see if they cannot produce something to make this particular article a little bit cheaper. In cases I have known of years ago we started out with a grade of box board of an A-No. 1 grade when we first introduced it; inside of four or five years the grade kept going down, going down, until it eventually got down to the chip board class and eventually the grade went out of existence.

These are the things that I have come in contact with in the sales end.

Now, I think it would be a fine thing for the superintendents to get out once in a while with the salesmen. Do not let the salesman bring back a report as to what he thinks the public ought to have, but go and see for yourselves and find out what the public wants, so that you may give it to them. We are not doing that. The salesman goes out, gets the order, using any means or method to get it on his books so as to make his standing the best he can, but that does not advance the industry.

As I size it up, the mission of the Superintendents' Association is to assist in the advancement of the industry by improving the quality of the various grades, through honest manufacturing methods and at honest prices. We are making too much poor stuff, particularly in the box board line. Grades of board are not good enough for what we are trying to adapt them to, particularly in the fiber box game today, not because we want to or because we cannot do better, but because that is what the salesmen sell. I will speak more definitely on fiber boxes, as that is in my end of the line. The salesman doesn't fight for the quality. He isn't interested in quality. As a matter of fact, he doesn't know what quality is when he sees it, and the only way he can get that information or that knowledge is to be in direct contact with the manufacturer or have the experience of manufacturing the article and then he can demonstrate quality. Otherwise he doesn't know how to talk on the subject of quality.

Now, that is why I think the superintendent should go out and get in personal touch with the situation, in order to be able to produce the quality and grade that is required by the public, from his own personal investigations.

(Mr. Bert then read his paper, which appears elsewhere in this issue.)

The President: Mr. Grau says my introductions are very short, which reminds me of a story told of one of our leading men up at Wausau who was invited to speak at a meeting. When the chairman had finished introducing him the time was so late and the assemblage so tired that the speaker of the evening decided to make it very short, which he did by saying "Good night. The chairman has covered the subject much better than I can." The next number that we are going to have on the program is an address on casein by Mr. Harry L. Derby.

Mr. Harry L. Derby: Mr. Chairman and Gentlemen of the American Pulp and Paper Mill Superintendents' Association: It is always difficult to discuss a technical subject before a body of men many of whom have greater knowledge and more far-reaching experience than the speaker.

In appearing before you, I do so, therefore, with some reluctance, and I am frank to say that one of the controlling reasons for my accepting the very kind invitation of your Secretary, Mr. Massey, to address you, was the opportunity afforded to meet collectively so many of my friends in your association. That, together with the honor of the invitation, sufficed to over-ride my better judgment against presenting a subject so familiar to a large portion of your membership.

There are some here who, never having been connected with the coating department of a paper mill, perhaps are not entirely familiar with casein and its various functions, and to them there may be some facts presented which are novel and therefore may be interesting. Of those here who are authority on the subject of casein, I ask indulgent consideration.

(Mr. Derby then read his paper, which appears elsewhere in this issue.)

The President: Any questions that you would like to ask Mr. Derby? Have any of you coated mill men got any questions to ask? I am sure we thank you very much for your paper, Mr. Derby, and I am sure that it has answered some of the questions they had in mind.

The next report we have on the program is the Ground Work Committee's Report, of which Mr. John E. Mulchaey is the Chairman.

Mr. John E. Mulchaey: Mr. Chairman and gentlemen: Mr. Massey asked me to get a paper out on this subject, but I neglected to do so; you will therefore bear with me in my attempt to place before you an oral report on this subject.

(Mr. John E. Mulchaey's address appears elsewhere in this issue.)

The President: I wish to thank Mr. Mulchaey for his splendid message, as I am sure it will benefit the paper men present. If any of you gentlemen wish to know any more about the production of ground wood with electric motor driven grinders, Mr. Mulchaey will be only too glad to assist you.

The next report we have is on the beater room. Now, this don't cut much figure with fellows like Mulchaey and some of your other print men here, but with fellows that are making a higher grade of paper it cuts a very big figure. I think Mr. Mericle has a message for us.

Mr. Mericle: Mr. President and gentlemen: I think this manuscript idea is a pretty good idea and I will follow it along by reading mine.

(Mr. Mericle then read his paper, which appears elsewhere in this issue.)

The President: I wish to corroborate the statements made by Mr. Mericle in his paper, and while I can truthfully say that it is a very weighty problem, it is none too big for the Superintendents' Association, and I wish to say to the members of the Beater Room Committee that we are with you in this work. There has been considerable improvements in the methods of handling the equipment we now have. I know that Mr. Nash has installed a number of recording devices in his beater room and handles his work in a very scientific manner, reducing the human element to as low a figure as possible, but the real cure is to develop the machinery before we can make a real stride forward.

We have on the Sulphite Committee, besides Mr. O'Connell, Mr. Ed. M. Lenges, Mr. Shure, Mr. Tomczak, Mr. Sievert, Mr. Davies, Mr. Berger, Mr. McFarlane and Mr. Whitman, and I think that for just a few minutes, while Mr. O'Connell is being detained on business for his company, we will hear a few words on the Acid Plant from Mr. O. L. Berger, better known as Olie.

Mr. O. L. Berger: Mr. Chairman and fellow-members: I was requested by the Vice President of this organization, Mr. O'Connell, to say a few words about the new way of making acid. I have been out on the road for a long time lately and this letter just got me a couple of days ago, and I haven't really had time to prepare a nice paper on it. I will have to give it to you extemporaneously as well as I can.

I am very proud to be called on on this occasion and I realize that your organization has a great future ahead of it. Being on the road, I have heard a good many remarks about it, and as near as I can understand the people in the East are just as much interested as the people in the middle West and West, and so I think before very long you will have a large membership in the eastern states and Canada.

I think that an aggregation of practical men like we all are will do more towards helping the process of making paper than anything else that can possibly be done. We are all here, good, practical, every-day men that have to deliver the goods and who are responsible for the product. I can plainly see that an organization of this kind will do more than any other thing to help the process along.

(Mr. Berger then delivered his address, which appears elsewhere in this issue.)

The President: Has anybody any questions to ask Mr. Berger? We have got to have a little discussion on some of these papers here. I know there are a lot of you interested in sulphite.

Mr. Ed. M. Lenges: I don't see how you can have any discussion when he is right in what he says. However, we will have quite a number of questions to ask at our meeting tomorrow afternoon. I do wish to say that when Mr. Berger was up our way a while ago, he suggested to me some changes in my reclaiming system, and after I got to looking that over and made some changes I increased the capacity of our plant from 32½ tons to 39 tons per day just by a few simple changes in my reclaiming system. And it was done with those same towers that are illustrated there. That is a pretty good showing and I got my sulphur down from 310 pounds to 270 pounds. I think I can get it down to 240 or 250 pounds in the next few weeks.

The President: Any further questions? Any of the box board men got anything to say in regard to sulphite? I think Mr. Berger can answer any questions you have got to ask him.

Mr. John Hercher: I do not believe there are many of the box board men present who are using sulphite. I know that I am using sulphate and I wish that Mr. Bert would enlighten us in the use of No. 2 sulphite at the board meeting tomorrow.

The President: I think we will hear now from Mr. Massey, who will tell us just exactly what the next step on the program is to be. He says he has been very busy, but that is the kind of fellows we like.

(Mr. Massey then made some announcements regarding the auto trip and the dinner and entertainment in the evening, and concluded with the following remarks:)

Mr. Massey: I must say that I am very much disappointed in your not having asked the speaker more questions. I believe we ought to have had more discussion. This meeting was not up to par with the last two meetings that we have had. Of course you have had some very splendid talks here this morning, but that is not the only reason we are assembled here. While I am sure you have profited by these addresses this morning, I am positive that it is not the talks that are going to do you the most good; it is in the discussions that follow where you will derive the most benefit. I know at the last meeting at Kalamazoo we had quite a little discussion, and up at Wausau we had plenty of it. Mr. Henry Bert talked about the container box and pointed to the need of having a standard container box board. He didn't cover the methods of manufacture of it today. If you want to ask Mr. Bert any questions in conjunction with the manufacture of chip board or box board of any kind, he is willing to talk and I believe every other gentleman who delivered a paper this morning is willing to answer any other questions you may have in mind. What these gentlemen presented to you in their papers was just a formal report and they have waited for you to ask any questions upon any point they did not cover. I know Mr. Mulchaey will gladly answer any questions you may have in mind on the subject of ground wood, and Mr. Bert will be only too glad to answer any questions concerning box board.

After this discussion we will have our lunch served here. The United States Rubber Company donated this luncheon which was originally planned to be served at their factory, but on account of not having sufficient facilities out there to accommodate this large crowd I have made the necessary arrangements to have the luncheon served here. Immediately after the luncheon is over, automobiles will be ready to take us out to the United States Rubber Company's plant. Their exhibit will consist of rubber rolls in the various stages of manufacture from the stripped core to the finished roll. After inspecting this plant, we will again board the autos to the Chicago Mill & Lumber Company's mill. I believe Mr. Rainey will tell us what they will show us there. Among other things will be how to make good container board out of Chicago River water. I do not believe that there is anybody present that is using any water quite so bad as our own Chicago River at Sangamon street, and Mr. Rainey is making a high test container board that is always up to standard.

Mr. Rainey: Mr. President and gentlemen: Our manager asked me to extend an invitation to this meeting and have you gentlemen come over and view our plant. We think we have got a good box board mill and that we make good board. Of course I don't think we are really up-to-date as yet, but we are very proud of our plant and we feel that we are putting out a box that is at least equal to any box on the market, so we hope that you will all come over and see both the plant and the product for yourselves., and I assure you that it will give me pleasure to explain any of our processes and answer any questions. (Applause.)

The President: There is an old friend of mine here today, a fellow that I have known for about twenty years, and he comes from Canada, and I am going to ask him how he came to attend this meeting and how he came to find out all about this Paper Mill Superintendents' Association. I will call on Mr. Dan Daverin.

Mr. Dan Daverin: Mr. Chairman and gentlemen: I was invited down here through a letter from Mr. Massey, who explained the aims and ambitions of your organization, and as I knew that my old friend was the President of the organization I got Mr. Burns talked up and we both came down. We thought we would come over and see for ourselves what you fellows were doing here. I wish to congratulate you on the very splendid meeting here and say that I am very glad to be with you. When you called off the names of those present, or, rather, when you called for them to introduce themselves, I noticed that I had quite a number of old friends amongst the audience. I want to thank you very kindly for your invitation. I know I will enjoy every minute of my visit and that you can count on us for assistance. (Applause.)

The President: We have a few more minutes, gentlemen. You know, we had a meeting up at Wausau a short time ago and one of our superintendents up there promised faithfully to attend and give us a long talk, but instead of that he came down to Chicago to attend the baseball game. I think he ought to give us an apology or something. I would like to hear from Mr. Paul A. Smith. (Laughter.)

Mr. Paul A. Smith: Mr. Chairman: I have an apology to make. I did intend to go to that Wausau meeting, but I also had arranged for tickets to the ball game, and the tickets were bought and I didn't want to back out from seeing that game. As you know, I am a baseball fan and I hope you will accept my apology and sincere regrets for not being there at that meeting. I thank you. (Applause.)

The President: Is there any further discussion, gentlemen? If not, we will stand adjourned for lunch.

Whereupon an adjournment was taken until Friday, November 7, 1919, at 10 o'clock a. m.

The visit to the U. S. Rubber Co.'s factory was very interesting to every one. Competent guides were assigned to groups of ten men each and explained the entire process of manufacturing rubber rolls and rubber hose from the raw Ceylon and Para gums to the finished product. The various processes were a revelation to every one present on this trip as very few laymen are ever allowed to enter into the secret mysteries of rubber goods manufacture, but on this occasion the superintendents were shown every process used, even that most holy of holies, the mixing room, where the various mixtures are compounded.

After thoroughly inspecting the entire factory, the superintendents were transported to the Chicago Mill & Lumber Co.'s box board mill at Sangamon street and the Chicago River.

The trip of inspection at the mill was begun at the power station equipment. The boiler plant called for a great deal of comment, with its coal crushing, overhead concrete coal bunkers with automatic weighing attachment, automatic stokers and the latest developments in recording instruments.

The model engine room, with its three large cross compound Hamilton engines, was as clean and efficient as the day it was first put into commission.

The party was then escorted to the water purification and filtration plant which takes Chicago River water and makes it fit for paper making purposes. When you consider that the sewage of the mill is 50 per cent cleaner than the water from the river, you can realize the problem that was overcome in order to make possible the production of a high-grade container board.

In the paper mill proper the upright dryer system as installed on their paper machine was the principal point of interest and caused considerable and favorable comment on account of the accessibility and simplicity of its installation.

The box factory was then visited and the various operations necessary to turn out the finished container box, that is famous for its quality and strength, were viewed with general interest, especially by the Box Board Men. In the box factory, as in every other department, the outstanding features were the latest improved machinery used in manufacturing and handling their product, such as traveling cranes, Economy handling system and lift trucks, also the light and cleanliness throughout the plant which must be undoubtedly reflected in their product.

After leaving the mill the autos were again impressed into service for a trip on Chicago's boulevard system, returning in time for the dinner and entertainment at the Congress Hotel.

At 6:30 the informal dinner was served. During the dinner the superintendents and their friends were entertained by a seven-piece orchestra and four vocal artists. After the dinner a vaudeville performance, consisting of six numbers,

was given, the performance closing with the singing of "The Star Spangled Banner" by all present.

Friday Morning Session

The meeting was opened at 10 a. m., with President F. C. Boyce in the chair.

The first speaker called upon was Mr. George P. Hambrecht, President of the Industrial Commissions of the United States and Canada, who delivered an address on "Industrial Relations" that was a real masterpiece. He was followed by Mr. W. T. Schmitt of the American Writing Paper Co., who presented a paper on "The Paper Mill Cost System," and benefits that are derived therefrom and the pitfalls that must be guarded against. The last speaker of the morning session was Mr. K. Barth, on "The Perservation of Paper Mill Roofs," illustrated with lantern slides. At 12:15 the meeting was adjourned and luncheon was served.

Friday Afternoon Session

Combined Meeting of Printing and Paper Superintendents

The meeting reconvened at 1:15 p. m., with President F. C. Boyce presiding. A communication was read by the Secretary from Mr. H. P. Carruth, which stated that owing to some very important business he would be unable to attend. This was the only disappointment experienced during the entire meeting. Taking into consideration the extensive program that had been arranged, the superintendents are to be congratulated that only one of the many numbers on the program failed them.

As it was impossible to substitute anyone in place of Mr. Carruth, Mr. Otto Kress and Mr. P. J. Massey endeavored to cover as much as possible the subject assigned to Mr. Carruth in addition to their own address.

Mr. Ed. T. Coughlin presented a very interesting paper on the subject of "Coated Papers."

Dr. Otto Kress delivered an address on "Physical Constants of Paper," and Mr. P. J. Massey delivered an address on the "Difficulties Encountered with Printing Papers."

The afternoon session closed after a very lively discussion by both the Printing and Paper Mill Superintendents on Mr. Massey's address.

The Evening Session

The banquet was served at 6:30 p. m. in the Florentine Room. There was considerable rivalry between the Michigan and Wisconsin Divisions, as was evidenced by the numerous calls for the orchestra leader to play "Back to Michigan" and "On Wisconsin," and gave the assemblage the appearance of a class reunion, with each class trying to outdo the other with their class song instead of an assemblage of staid old Paper Mill Superintendents.

After the banquet, Mr. W. F. Hirst of the Swigart Paper Co. presided as toastmaster and delivered the goods as usual in his own inimitable style. The three short talks of the evening were delivered by Mr. L. E. Blackmer, for the Paper Manufacturer; Mr. Homer J. Buckley of Buckley, Dement & Co., for the Printer, and R. C. Fay of The Chicago Paper Co., for the Paper Jobbers.

After a few vaudeville acts the meeting was closed with a short farewell talk by Mr. Massey and the singing of "Till We Meet Again."

The whole meeting was a very tremendous success, away and beyond any conception of the committee. It is believed by the officers of the Association that every one present felt that he had attended a large family reunion and that part of the time was occupied not in formally discussing technical matters but in just talking shop and exchanging views and information in an interested, friendly way for their mutual benefit, as would be done at any family reunion, after the men got together and lit up their cigars.

Among Those Present

C. K. Andrews, Itasca Paper Co.; A. G. Adams, Stewart-Adams Co.; H. J. Andrews, Griley-Unkle Eng. Co.; D. C. Andrews, Northwest Paper Co.; Mr. Ambruster, Lincoln Paper Mills; Henry Bert, Downing Box Co.; Thomas A. Burbank, Cornell Wood Products Co.; P. Byrne, Riordon Paper Mills Co.; T. S. Beeson, Hooven, Owens, Rentschler Co.; F. C. Boyce, Wausau Paper Mills Co.; A. Blackmer, University of Wisconsin; George Bonner, Falls Mfg. Co.; H. E. Ballsley, Hooven, Owens, Rentschler Co.; O. L. Berger, G. D. Jenssen Co.; W. H. Burns, Valley Iron Works Co.; W. N. Benzing, Champion Fibre Co.; E. W. Bassler, Daley Mfg. Co.; R. G. Baker, Seaman Paper Co.; E. T. A. Coughlin, Monarch Paper Co.; M. J. Cornell, Carthage Sulphite Pulp & Paper Co.; Richard Clayton, Alton Box Board & Paper Co.; James S. Clemons, Hummel & Downing Co.; R. J. Cunningham, Northern Paper Mills; W. L. Davis, Dells Paper Co.; A. Deane, National Biscuit Co., Boxboard Mill; Peter F. Denner, Kalamazoo Paper Co.; T. E. Dial, Vacuum Oil Co.; G. A. Dowd, Dowd Knife Works; S. F. Duncan, Provincial Paper Mills; T. A. Duffy, Economy Engineering Co.; Dan Deverin, Provincial Paper Mills; H. L. Derby, Kalbfliesch Corp.; J. E. Dailey, Port Huron Sulphite & Paper Co.; W. J. Dolan, Escanaba Paper Co.; Frank B. Eilers, Eilers Mill Supply Co.; William T. Fogarty, Northern Paper Co.; G. K. Ferguson, Watervliet Paper Co.; E. H. Gilman, Bryant Paper Co.; W. H. Guidette, Heller & Merz Co.; John Hercher, John Strange Paper Co.; Eugene A. Hibbard, French Paper Co.; H. G. Harris, Westinghouse Electric Co.; G. A. Hepke, Hooven, Owens, Rentschler Co.; John H. Hollingsworth, Oswego Falls Pulp & Paper Co.; T. P. Hanson, United States Rubber Co.; T. G. Johnson, Northwest Paper Co.; E. E. Jones, United States Rubber Co.; Wm. A. Kelly, Marathon Paper Co.; H. L. Kutter, Black-Clawson Co.; E. L. Kennedy, Chicago Mill & Lumber Co.; Dr. Otto Kress, Forest Products Lab.; A. C. Duncan, Western Paper Makers Chemical Co.; Edward M. Lenges, Wolf River Paper & Fibre Co.; John Lowe, Appleton Coated Paper Co.; E. J. Lachman, Lakeside Paper Co.; Joseph Mulchaey, Flambeau Paper Co.; A. T. McFarlane, Green Bay Paper Co.; Arthur McPhillips, Dowd Knife Works; J. T. Mader, Menasha Printing & Carton Co.; G. W. Mericle, Geo. A. Whiting Paper Co.; R. L. Michael, Wolf River Paper Co.; R. L. Miller, E. I. DuPont deNemours Co.; Frank W. Monaghan, Wausau Sulphate Fibre Co.; John E. Mulchaey, Grandfathers Falls Paper Co.; Elbert G. Milham, Bryant Paper Co.; E. J. McGrau, United States Rubber Co.; A. J. McMillan, Chicago Coated Board Co.; John Dalton, Sears, Roebuck & Co., Dept. 273; H. C. McDaniels, Waldorf Paper Products Co.; F. J. Milson, Wm. Penn M. F. G. Co.; J. T. Murphy, Chicago Mill & Lumber Co.; John A. Murray, Wm. A. Hardy & Son Co.; A. Aldrich, Beloit Iron Works; Wm. C. Nash, Lakeside Paper Co.; Ray North, Green Bay Foundry & Machine Co.; R. H. Breyfogle, Draper Bros. Co.; Chas. A. Noble, Bardeen Paper Co.; F. A. Bonchers, Menasha Paper Co.; Homer Buckley, Buckley, Dement & Co.; K. Barth, The Barrett Co.; E. L. Outterson, Carthage Sulphite & Paper Co.; James L. Carey, J. E. Cavanagh, Seaman Paper Co.; L. T. Dwyer, Seaman Paper Co.; John H. O'Connell, King Paper Co.; D. F. O'Connell, Northern Paper Mills; E. S. Daniell, unattached, Greenland, N. H.; K. R. Elwell, United States Rubber Co.; J. Faxdrover, Western Paper Makers Chemical Co.; E. B. Fritz, The Paper Industry; A. H. Pritchard, Vacuum Oil Co.; Geo. T. Phillips, Port Huron Sulphite Pulp & Paper Co.; R. C. Fay, Chicago Paper Co.; G. L. Panushka, United States Rubber Co.; E. Huber, Chicago Association of Commerce; Harry Hillman, editor The Inland Printer; Jacob Parent, Western Board & Paper Co.; C. J. Homan, Union Bag & Paper Corp.; G. P. Hambrecht, Chairman Industrial Commission of Wisconsin; W. F. Hirst, Swigart Paper Co.; O. B. Johnson, Hewitt Paper Co.; M. D. Johnson, Republic Flow Meter Co.; J. H. Jewitt, R. & J. Dick Co.; E. L. Kichal, Union Bag & Paper Corp.; Wm. Kreske, unattached superintendent, Grand Rapids, Wis.; Peter King, Kalamazoo; Kent F. Lockwood, Chicago; Charles E. Raney, Mid-West Box Co.; E. E. Libbey, The Russell A. Pettingell Co.; A. Corengel, Chicago; Ed. Raney, Chicago Mill & Lumber Co.; T. P. Hannon, United States Rubber Co.; A. J. Redemski, Chicago Mill & Lumber Co.; C. D. Freeburn, Vacuum Oil Co.; M. Redmond, Kalamazoo Paper Co.; C. T. Ramsden, Beloit Iron Works; Frank Rain, Chicago Mill & Lumber Co.; Fred A. Smith, Mullen Bros. Paper Co.; Paul A. Smith, Combined Locks Paper Co.; C. E. Stoke, Wausau Sulphate Fibre Co.; F. M. Stephens, Seaman Paper Co.; C. A. Croxan, Chicago; H. P. Consoll, Jennison-Wright Co.; Thomas H. Savery, Jr., E. W. Sharpless, Menasha Printing & Carton Co.; L. D. Bigelow, W. E. Scott, Whitaker Paper Co.; P. J. Sievert, M. & N. Paper Co.; S. E. Tomczak, Flambeau Paper Co.; Thomas Tucker, Crescent Paper Co.; H. H. Prast, Economy Engineering Co.; J. S. O. 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T. Wamsley, Seaman Paper Co.; F. B. Whiting, Geo. A. Whiting Paper Co.; C. M. Wolganood, Chicago; M. C. Ziemann, Abitibi Pulp and Paper Co.; W. A. Yule, F. C. Huyck & Sons; J. E. Costello, Pulp & Paper Trading Co.; Peter J. Massey, Secretary-Treasurer.

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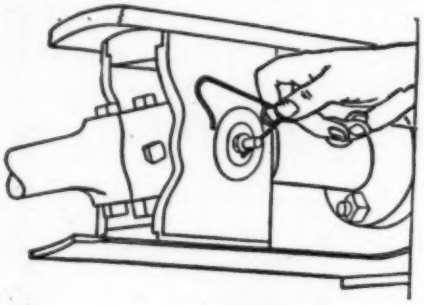
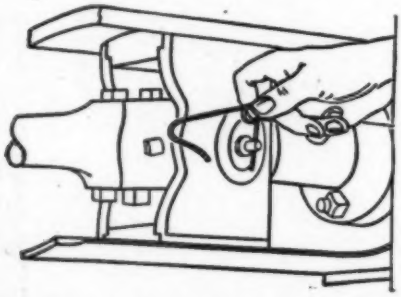


easily and quickly connect the indicator cord with the cross-head of a high-speed engine as with a low-speed engine.

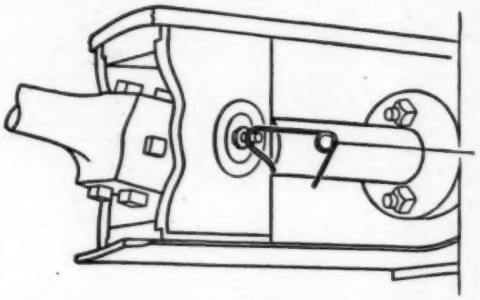
Experienced engineers appreciate the difficulties and dangers involved in connecting the ordinary in-



dicator cord to the standard on a cross-head. This is especially true in cramped places and on high-speed engines. Not only does the engineer risk his life, but there is danger that the indicator may be wrecked.

Numerous devices have already been designed for safely accomplishing this feat, but these devices, although more or less successful, have proved cumbersome and expensive.

The three accompanying illustrations clearly show how the patented trill cord hook is attached while the engine is running. The loop of the hook is held between the thumb and the finger as illustrated in Fig. 1, in such a position as to allow the pin on the standard to strike the straight part of the hook when the standard is within about one inch of the end of its travel. The hook swings about the thumb and finger as a pivot, as illustrated in Fig. 2, which action



shoves the hook downward. At that instant the piston has reached the end of its stroke. On the return stroke the pin on the standard engages the hook, as illustrated in Fig. 3, and the attachment is complete. The operation is very simple, and there is absolutely no danger involved.

Method of Determining Moisture Content of Wood

The Forest Products Laboratory, Madison, Wis., gives the following directions for determining the moisture content of wood:

1. Select a representative sample or disc of the material.

2. Immediately after sawing, remove all loose splinters and weigh the sample.

3. Put sample in a drying oven at 212° Fahrenheit (100° Centigrade) and dry until constant weight is attained.

4. Re-weigh the sample to obtain the oven dry weight.

5. Express the loss in weight as a percentage of the dry weight, thus:

$$\text{Percentage moisture} = \frac{\text{original weight} - \text{oven-dry weight}}{\text{oven-dry weight}} \times 100$$

Short pieces of wood dry out much more rapidly than long ones. In order to reduce the time required

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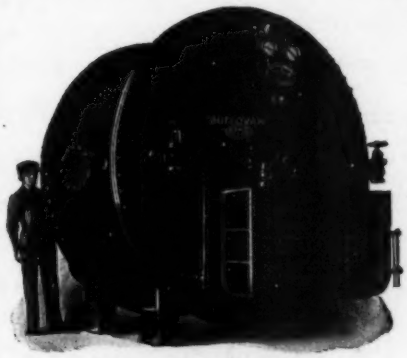

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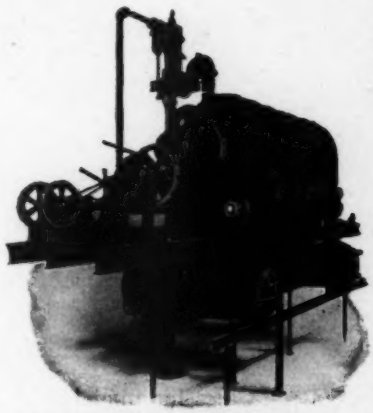

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than long ones. In order to reduce the time required for drying, therefore, the length of the sample in the direction of the grain should usually be about 1 inch, or not more than to give the sample a volume of from 2 to 24 cubic inches.

It is important that the weight be taken immediately after the sample is cut, for the material is subject to moisture changes on exposure to the air. The degree and rapidity of change are dependent on the moisture content of the piece and the air condition to which it is exposed.

In order to insure good results, the weights should be correct to within at least one-half of one per cent.

When placed in the oven for drying, the samples should be open-piled to allow free access of air to each piece.

Acid Proof Linings for Experimental Sulphite Digester

The problem of lining an experimental sulphite digester is different in many respects from lining problems encountered in commercial practice. The most important difference is that due to size. Others arise from the fact that in order to obtain quantitative yields, the experimental digester must be washed free of pulp immediately after each blow, and a lining which spalls off and produces a dirty pulp is unsatisfactory. It is out of the question to riffle the pulp and obtain reliable yields.

Many different kinds of linings were installed in the experimental digester at the Forest Products Laboratory before a satisfactory one was found. Because of difficulties due to size, tiling similar to that used in commercial installations was impractical. Lead was first tried, but was soon discarded on account of the "creeping" action of this metal when subjected alternately to heat and cold. Bronze was found to produce dirty pulp. A solid lining of litharge and glycerine lasted only a short time. Then cement briquets were made of many mixtures, given different coatings, and subjected to the action of sulphite cooking acid. The results of this experiment led to the installation of a lining of 1:1 cement and crushed quartz sand, 3 inches thick and coated with sodium silicate. This lining held up fairly well for some time, though particles of sand were continually falling off and causing dirty pulp.

It was finally decided that the only way out of the difficulty was to install a solid stoneware casting of acid proof tile 1½ inch thick. As the digester is joined in the middle, the shape of the casting offered no particular difficulties. Liberal tolerances were allowed on all dimensions and openings difficult to locate were omitted in the casting. A stone cutter with an air chisel was able to put these holes through without breakage after the casting was in place and backed with cement. This lining has proved exceedingly satisfactory.

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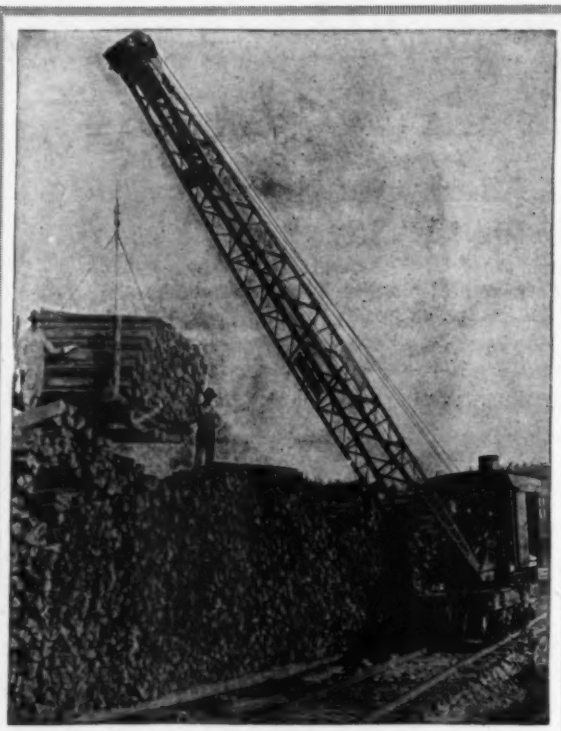

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Process of Dissolving Cellulose

Pat. No. 1,315,393

An invention by Zeno Ostenberg relates to the process of producing solutions of cellulose by dissolving cellulose in suitable mixtures of hydro-chloric acid, sulfuric acid and phosphoric acid, reference being made to Patent No. 1,218,954, dated March 13, 1917.

The use of highly concentrated hydrogen chlorid solution in the process of dissolving cellulose renders that process somewhat expensive, and the use of the gas to form this concentrated acid renders the process inconvenient, complicated, undesirable and expensive. In my improved process I obviate the necessity of using hydrogen chlorid in the gaseous form by substituting therefor concentrated sulfuric and phosphoric acids.

Hydrochloric acid of a lower concentration than the acid of commerce (35.5% to 37.5% HCl) may be utilized in the same way by the addition of sufficient concentrated sulfuric and phosphoric acids. In fact, acids ranging in concentration from 25% HCl to 39% HCl have been utilized by me. Solutions of cellulose up to 17% in concentration may be obtained by dissolving the cellulose in the proper acid mixture at a temperature below 50° C. The greater concentration of hydrochloric acid the greater is the amount of cellulose dissolved. The solutions obtained are useful in the arts and sciences since the cellulose may be recovered in a number of ways or it may be allowed to hydrolyze and the glucose formed by hydrolysis may be recovered or fermented to alcohol. The mode of application of these acid mixtures is varied, depending on the result desired.

Example: 1 kilogram of air-dried cotton is kneaded with about 6 kilograms of a mixture of hydrochloric acvid (35% HCl) 9 parts, sulfuric acid (99%) ½ part, and phosphoric acid (85%) 2 parts, all by weight, the solution is cooled to prevent escape of HCl. A thick viscid mass results which may be clarified and then forced through nozzles into a suitable coagulating bath, as water, dilute acids, solutions of various salts, solutions of colloids and various other media such as alcohol, etc.

Paper Bottle

Pat. No. 1,315,394

This invention by George R. Penn relates to paper bottles, and one of its objects is to provide a container of this character having end closures all portions of which are located entirely within the walls of the container so that a number of the containers can be packed in a carton which would be too small to hold a like number of containers of the same capacity having caps extending around or housing the ends of the containers.

A further object is to provide a container utilizing flat abutments or shoulders constituting seats for the

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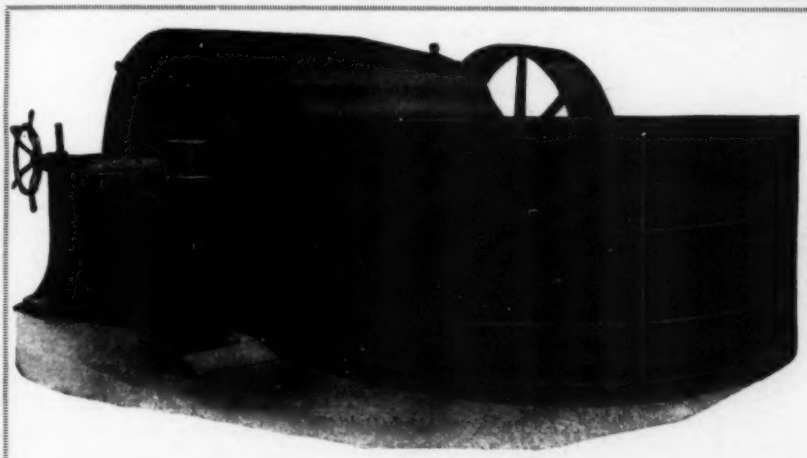

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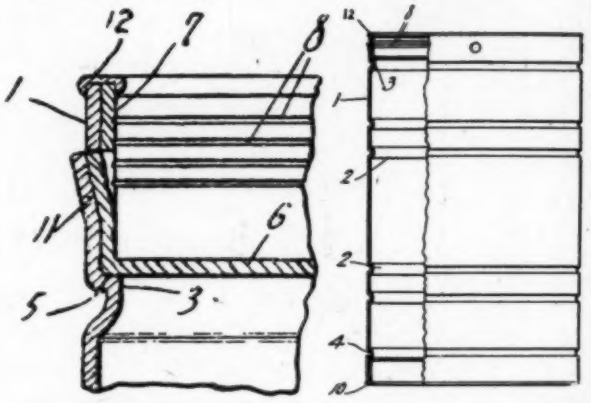
inserted caps, thus to constitute a more efficient seal than would otherwise be possible.

Another object is to provide a removable cap having simple and efficient means for stiffening the flange thereof, said means also serving to facilitate the removal of the cap without requiring the use of a tab or the like, as heretofore.



A still further object is to provide novel means for sealing the caps when placed in the container, thereby to render the container air tight.

Another object is to provide novel means for locking the caps in position.

Figure 1 is a view partly in section and partly in elevation of a paper bottle embodying the present improvements.

Figure 2 is an enlarged section through a portion of one cap and showing the means for detachably securing it in place.

Figure 3 is an enlarged section through a portion of a container and showing a modified means for securing the cap in position.

What is claimed is:

1. The combination with a paper container having an exterior annular groove, of a stiffening rib formed by pressing the groove into the container and having a flat stiffening face perpendicular to the axis of the container, and a closure insertible into the container and into engagement with said face.

2. The combination with a paper container, of a stiffening rib pressed thereinto, a flanged paper closure insertible into the container and into engagement with the rib, there being annular grooves pressed into the inner surface of the flange of the closure for holding the closure in shape prior to insertion.

McEwan Bros., box board manufacturers of Whippany, N. J., are installing a new board machine built by the Black-Clawson Company of Hamilton, O. The machine will be 150 inches wide and will trim 138 inches. Nine 2,000-lb. Dilts beating engines, six large Black-Clawson Jordan engines, four 611 h. p. Heinie boilers equipped with Riley underfeed stokers and super-heaters also are included in the new equipment

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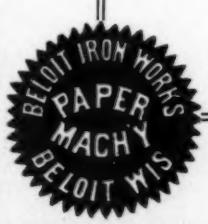

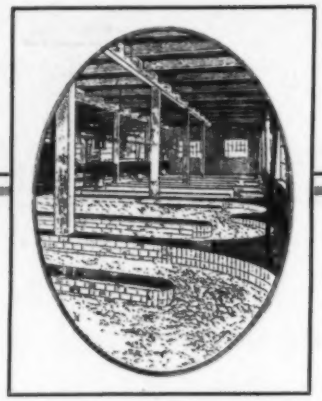

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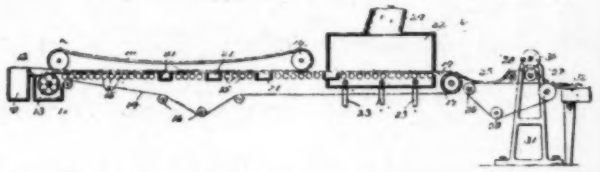
that is being installed by the McEwan Brothers, and in addition, two 750 k. w. steam turbines with auxiliary motors have been ordered to drive the new paper machine and the Jordan engines.

Production of Heavy Paper, Etc.

Pat. No. 1,315,924

The invention by Fred H. Fuller relates to the art of making paper.

Its object is to provide for greater efficiency and economy of manufacture and especially to enable the ready production and handling of thick sheets, such as box board or heavy paper, and to rapidly and successfully manufacture cellucotton made from bleached sulfite pulp as a substitute for the ordinary cotton commonly used in hospitals, etc. To do this

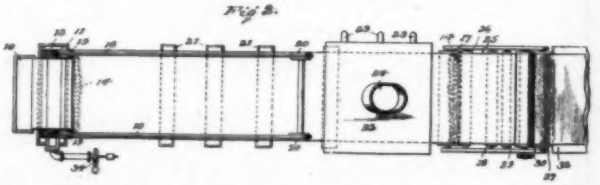


effectively I provide a method and a machine that will handle efficiently a thick but porous sheet.

To these ends my invention comprises the method set forth in the appended claims and the parts and combinations of parts there recited.

In the drawings Figure 1 is a side elevation partly in section; Figure 2 is a plan view.

In these drawings I have illustrated a combined Fourdrinier and cylinder machine. The arrangement



of the parts enables me to run a sheet of any desired thickness.

In these drawings 10 represents a flow box and 11 a head box having a lip 12 extending to the top of a cylinder mold 13, which I employ instead of the customary solid iron breast roll; 14 is the making-wire or wire-cloth which passes around the cylinder mold and, on the upper run, over the table rolls 15, and on the lower run over suitable guiding and tension rollers 16 making its outer or final turn about a blowing roll 17; 18 represents deckle straps running over pulleys 19 and 20 and arranged above the making-wire in the customary manner; 21 represents customary suction boxes arranged beneath the upper run of the making wire; 22 is a hot-air chamber through which passes the upper run of the making-wire carrying the material being treated, the inlets for the hot air being illustrated at 23 and the outlet at 24.

Ash handling has been simplified in the plants of the Bryant Paper Company, Kalamazoo, Michigan.

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Seventeen, as described, is a roll which takes the place of the customary suction roll, but in this case is a blowing roll. That is to say, air is blown through the openings in the roll instead of being drawn in through those openings and through the material; 25 is a carrying cloth or wire turning about pulleys 26 and 27 and having a customary guiding and tensioning roller 28 and a guide roller 29 which directs the material now dried between the cutters 30 comprising two opposed cutting wheels carried by the frame 31; 32 represents a table upon which sections of dried sheets are placed as they come from the cutter; 34 is the customary pump for the return water.

In using this apparatus the stock flows on to the making-wire from the head box, being held back by the customary slice not shown to enable the water to largely leave the stock and permitting the material to flow on to the making-wire in as thick a sheet as desired, this being regulated by the deckle or rubber strap holding the pulp in place on the wire.

As the pulp passes along on the upper run of the making-wire the remaining water is drawn out by the suction boxes, leaving the material still damp.

The cellucotton must not be pressed and it will be observed that I have dispensed with all pressure and couch rollers. It is necessary that the material be kept very porous. The making-wire or the wire-cloth carrying the partly dried substance now passes through the hot air chamber 22 where it receives blasts of hot air, the air passing through the sheet from the bottom upward and out of the top of the chamber.

This chamber may be of any desired length, sufficient to thoroughly dry the substance.

The sheet now passes over the roll 17.

Instead of having here a suction roller and applying a vacuum I blow air into and through this roll so as to cause the sheet to be blown off from the making-wire or wire-cloth to the carrying device 25 to be directed to the cutter 30 and thence delivered to the table 32. The cellucotton is therefore formed and carried through the machine without undergoing any pressure and it will be delivered in a porous, spongy condition.

It will be observed also that the stock flows onto the making-wire from the top side of the cylinder mold. Ordinarily cylinder machines pick up the stock as the cylinder revolves. This permits a certain thickness of the pulp to stick to the mold, and in order to make a thick or heavy paper in such case it is necessary to use a number of cylinder molds and to unite the sheets by pressing them together on the last mold. By my method of flowing the pulp over the top of the cylinder mold and onto the making-wire, as described, I free the pulp of water and get the desired thick sheet suitable for all grades of paper and especially for such a production as cellucotton.

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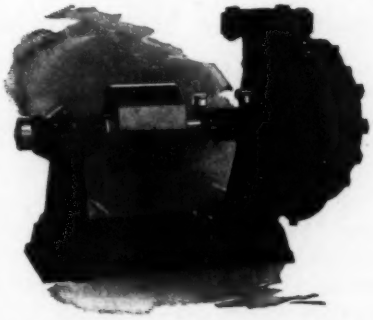

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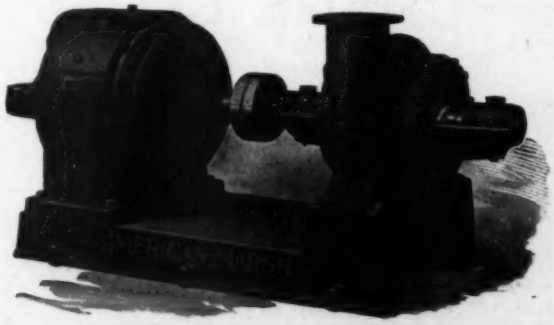

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The Claims

1. In a pulp drier, the combination of a flow box, a head box, a cylinder mold in the head box, means for flowing the stock over the cylinder mold and Fourdrinier connections receiving the stock.

2. In a pulp drier, the combination of a making roll and associated devices for carrying the stock, of a blowing roll at the finishing end of the making wire, and a hot air receptacle surrounding the end of the making-wire.

3. In a pulp drier the combination of a making-wire and table rolls, of a hot air chamber inclosing the finishing end of the table rolls and making-wire, and means for supplying air to the chamber.

4. A combination Fourdrinier and cylinder machine comprising a flow box, a head box, a cylinder mold in the head box, means for conveying the stock from the flow box over the cylinder mold, a making wire and table rolls receiving the stock, means for blowing hot air through the stock and means for blowing air through the treated material after it is heated to loosen it.

5. In a paper making machine, the combination of a flow box or vat, a head box, a cylinder in the head box, a making-wire passing about the cylinder, and means for feeding and drying the stock without subjecting it to pressure.

6. In a pulp drier, the combination of a making-wire, a roll over which passes the rear end of the making-wire, means for blowing air through the roll and the material, a carrier to receive the material, and cutters lying above the carrier.

Waste Liquid Sulfur Dioxide from Smelters for Manufacture of Sulfite Acid

The Forest Products Laboratory is bringing to the attention of paper makers the possibility of utilizing liquid sulfur dioxide from the stack gases of smelters for the manufacture of sulfite acid. Liquid sulfur dioxide has many advantages over sulfur for this purpose, and the only disadvantage is the long haul between the smelters and most existing pulp-making centers. In certain cases, however, utilization of smelter gas assuredly offers material saving in cost as well as greater flexibility and ease of operation.

The smelter product is free from all foreign material except perhaps a very small amount of moisture. It might be produced in quantities far exceeding the demands of the sulfite industry.

Estimates indicate that liquid sulfur dioxide may be obtained f. o. b. at the smelter at a price considerably under that of an equivalent amount of sulfur. It would seem that paper mills should make use of this waste product wherever the freight charges permit.

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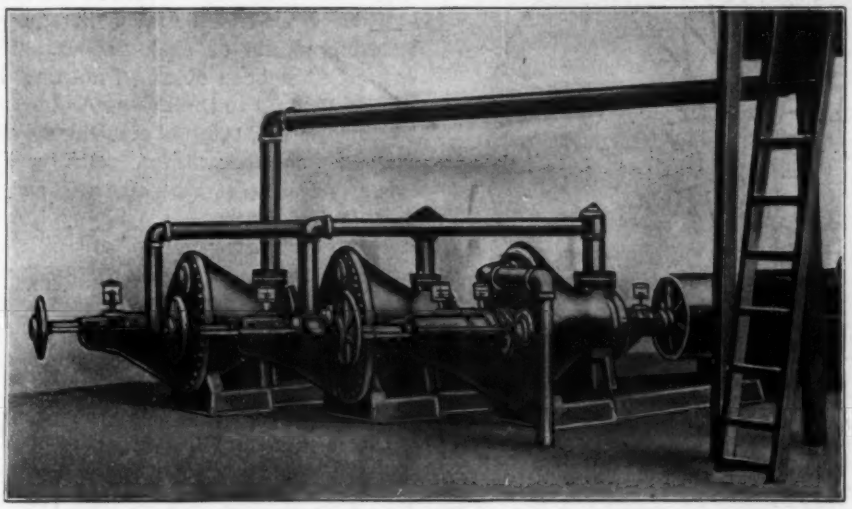

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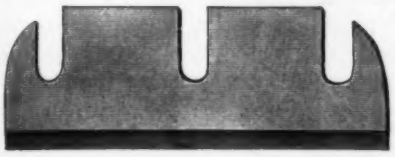

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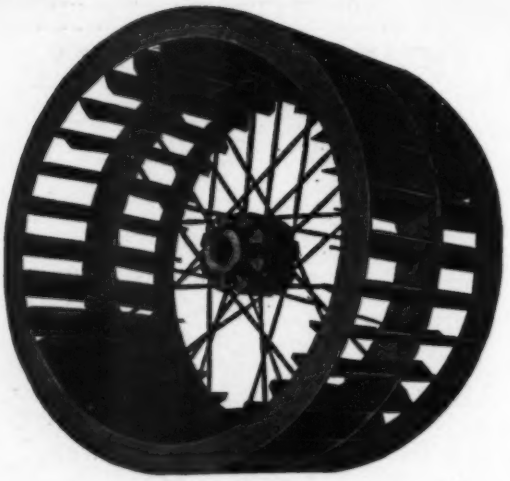

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When operating printing presses at printing speeds of from 30,000 to 36,000 papers per hour, however, there is more liability of the web breaking than is the case when operating the presses at 24,000 papers per hour or less, and in many cases the time lost from breaking of the webs on presses operating at 36,000 papers per hour decreases the actual output of the press to less than the average output obtained when printing at the rate of only 24,000 papers per hour with fewer breaks in the web.

Whenever the web breaks while the press is operating at printing speeds, the free end of the web usually becomes wound around cylinders and ink rolls before the pressman has time to stop the press, and in the case of press running at a printing speed of 36,000 papers per hour, approximately 50 per cent more paper will be wound on to the cylinders and rolls than is the case when the press runs at the rate of only 24,000 papers per hour, and it will then require approximately 50 per cent more time for removing this superfluous paper and putting the press into printing condition. Furthermore, with a large amount of paper wound upon the printing cylinders there is danger of straining the cylinder and the side frames of the press. It, therefore, follows that the average time lost per breakage of the web on the high speed press is greater than that lost by breakage of the web on a moderate speed press, while on the other hand the greater strain on the web printing at the higher speed tends to cause a greater number of breaks.

The total number of breakages on the web during a run at a speed of 36,000 papers per hour can be reduced to a minimum only by carefully watching and adjusting the tension of the web. The time lost for each breakage of the web can only be reduced by reducing to a minimum the amount of free paper wound upon the cylinders and the ink rolls when a breakage occurs. This can be accomplished only by stopping the press in the quickest possible time after the breakage occurs. No matter how closely the pressman watches the press while running at high

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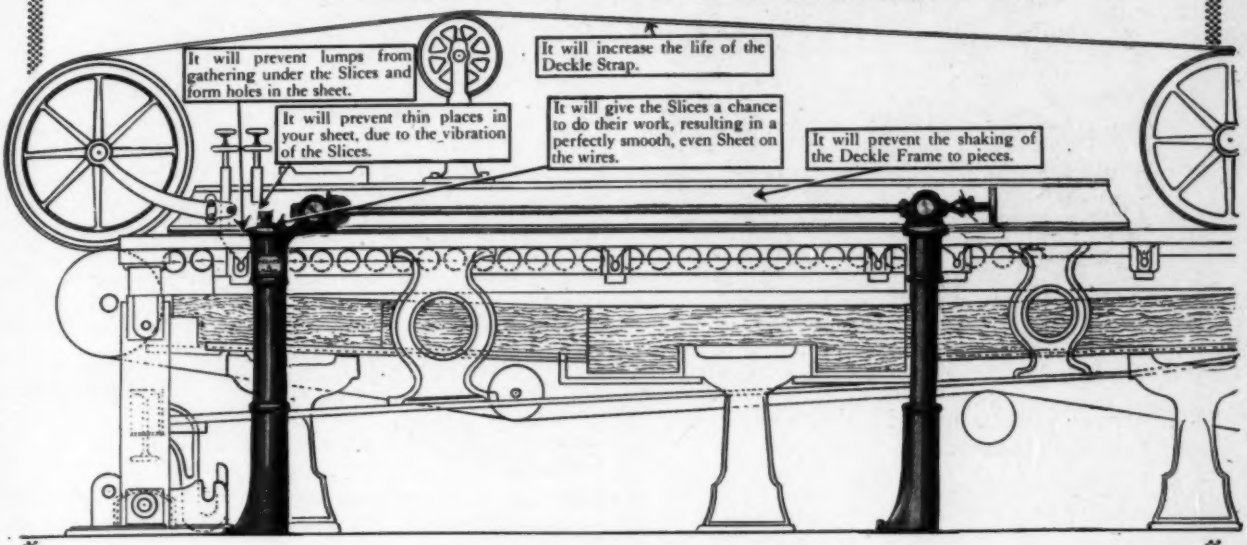
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CAPACITY 100,000 LBS. PER DAY

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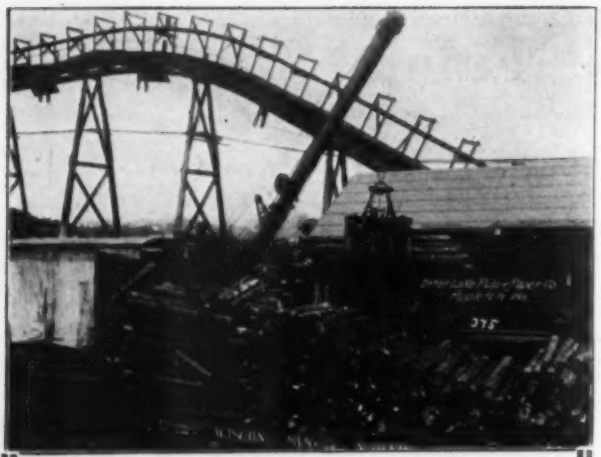

The Mountain Goes to Mohamet

¶ If you wish to unload pulpwood directly onto your woodpile—

¶ A carload of coal directly into your coal bins—

¶ Remove the accumulated rubbish in and about your wood yard—

¶ Handle any new machinery from the flat cars—

¶ Dig the excavation for any new addition to your plant—

BYERS' Auto Crane

will go right to the job. You do not have to bring the job to it.

¶ Runs like an automobile, using gasoline, steam or electricity for motive power and does all your sling, clamshell, grab, orange-peel or magnet work equally well. It will do all your regular loading, unloading or lifting work at a saving of many dollars in time and labor, paying for itself in a very short time. *Write for Bulletin No. 1016.*

John F. Byers Machine Company
311 Sycamore Street, Ravenna, Ohio

speed, there is a certain amount of time lost between the actual breakage of the web and the stopping of the press, due to the personal equation of the operator, and in order to eliminate this personal equation factor, and the time lost thereby, we have devised an automatic device for application directly to the printing webs which will instantly open the motor circuit and apply the brake to the motor whenever any one web in the press breaks.

The Automatic Paper Break Stop consists essentially of a number of switch mechanisms, mounted on one side of the press frame and mechanically connected to light levers bearing upon the several webs of paper as they pass through the press. Whenever a web breaks the lever bearing upon that web falls,

opening its corresponding switch, which in turn opens the main motor circuit and applies a brake to the motor and press, thereby practically paralleling the functions of the "stop" button and acting immediately upon the breakage of the web much more quickly than the pressman could detect the breakage of the web and push the "stop" button. After the web has broken, the driving motor and the press are automatically limited to the slow motion speed until the broken web is again threaded through the press. The action of threading the web through the press resets the automatic paper break switch lever, after the paper passes the former, leaving the motor and press in condition for acceleration to the desired printing speed by the manipulation of the "on" button in the usual manner.

Grinding of Wood from Young and Old Trees

Green or freshly cut wood is known to yield a more desirable ground wood pulp than seasoned wood. It is not unnatural to assume, therefore, that a similar difference might occur in the grinding of wood from very large trees, which contain a large proportion of heartwood, and smaller trees of the same species. This assumption has been verified by the Forest Products Laboratory, at Madison, Wis., in a series of commercial grinding experiments on wood from large and small white fir (Abies concolor), grown in Plumas County, California. Paper was afterwards made from the pulp on the laboratory machine, and tested for strength and color.

The small or young wood was cut from trees 18 inches or less in diameter, and the large or old wood was split from a single tree 40 inches in diameter and 130 feet high. Under like grinding conditions, the

Bardeen Paper Co.

Otsego, Mich.

Printing Papers of Merit

For LETTERPRESS, OFFSET *and* LITHOGRAPHIC PRINTING

Offset Blanks Offset Bristols

Porcelain, Peninsular and Purity Enamel Book

M.F. and S&SC Book and Catalog

English Finish Opaque

Coated Blanks

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THE WORLD STANDARD

The Mullen Paper Tester

The Adopted Standard of the United States Government, the Freight Classification Committees and the General Paper Trade.

The Mullen Paper Tester

Registers the breaking strength in actual pounds per square inch, not in a mere arbitrary scale. Made in various sizes to test all grades of paper goods from the lightest tissues to the heaviest boxboards.

Send for Catalogue and References

B. F. PERKINS & SON, Inc.

Sole Manufacturers HOLYOKE, MASS.

Hall, Ward & Walker

(INCORPORATED)

We Guarantee

¶ Standard news with less than 10% Sulphite, a yield of more than 2200 lbs. per cord peeled or prepared wood and at less than 65 H. P. per ton.

¶ Installations made without interruption of manufacture and for time of men and expenses only. No charge whatever unless guaranty fulfilled. License fee 10% of saving made or 20 cents per cord at licensee's option.

HALL, WARD & WALKER, Inc.

Sherman Building

WATERTOWN, N. Y.

Ticonderoga Machine Works

TICONDEROGA, N. Y., U. S. A.

MANUFACTURERS OF

WARREN IMPROVED CALENDER DOCTORS

With Flexible Blades, Universal Adjustment and Control (PATENTED)

WARREN IMPROVED PATENT DOUBLE DRUM WINDERS

Patent BALL VALVE Hydrant

Stock Circulating Systems *and* other Paper Mill Specialties

SEND FOR OUR BULLETIN

H. O. NUMAN

Barking Drums

Green Bay, Wis.

GATTI-McQUADE COMPANY

JOSEPH GATTI, *President*

Established 1894 Incorporated 1898

Tell Us Your Problems in

Paper Manufacturers' Supplies

¶ We have the EQUIPMENT to handle any TONNAGE you may desire.

¶ We are in a POSITION to give you the exact GRADE you require.

¶ Our CAREFUL GRADING assures you of UNIFORMITY.

¶ Our SORTING is done under SANITARY conditions in 2 large MODERN WAREHOUSES.

Every Standard Grade of

Rags, Paper Stock

Cotton — **Waste** — *Woolen*

We also carry a full line of

Kraft, Sulphite, Manila and Waterproof Wrapping Papers.

Straw, Binders, Chip, Lined and Coated Box Board.

Cotton, Hemp and Manila Cordage.

GATTI-McQUADE COMPANY

JOSEPH GATTI, *President*

Main Office: 200 Fifth Ave., New York City

WAREHOUSES:

Hoboken, New Jersey, Weehawken, New Jersey

Philadelphia Office: 1416 Wood St.

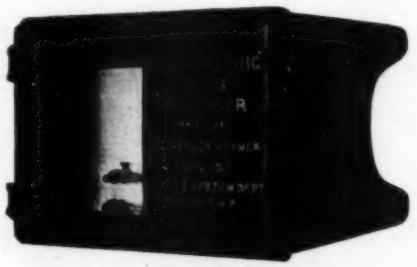
actual solid volume of old wood ground was, in every instance, appreciably less than the volume of young wood ground in the same time.

In brief, the tests demonstrate that (1) there is a considerable difference in the quality of pulp produced from white fir, depending upon whether the wood is taken from old or from young trees, and (2) the advantages as regard production, power consumption, strength, and color are all in favor of young wood.

As the average groundwood pulp from white fir was found to be darker or duller than is desirable for many grades of paper, it is entirely possible that a provision for sorting the young wood and grinding it separate from that taken from large trees would result in improving the color and quality.

Autographic Web Break Recorder

THE breaking of the web is a very serious matter in magazine or catalogue printing, as it very often is the cause of batters or smashes to the printing plates and make-ready that necessitate the making of new plates and loss of time in repairing the damage to the make-ready. While the large units now in use for this class of printing make the loss of one-half hour productive time a very serious matter in all catalogue and magazine rotary pressrooms, the breaking of the web is of vital im-



portance to the newspaper pressroom, where the time schedule is so close that every minute and even every second must be jealously guarded against loss. To enable the pressroom to meet the schedule laid out by the circulation department, it is imperative that the rolls of paper used be as free as possible from breaks of any description in order that connections with railroads and other distributing mediums may be made on time.

A few web-breaks will upset the whole pressroom schedule to such an extent that it may cause a large loss to the newspaper. Electrical devices are now installed in the majority of newspaper pressrooms, that not only stop the press automatically whenever a break occurs, but also record the number of breaks in each roll or each shipment in order to furnish the purchasing agent actual figures regarding the relative value of two shipments or between ship-

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Cale B. Forsythe, Kalamazoo, Mich.
Uniform Quality
Excellent Service
ENGLISH
DOMESTIC
The John W
HIGMAN
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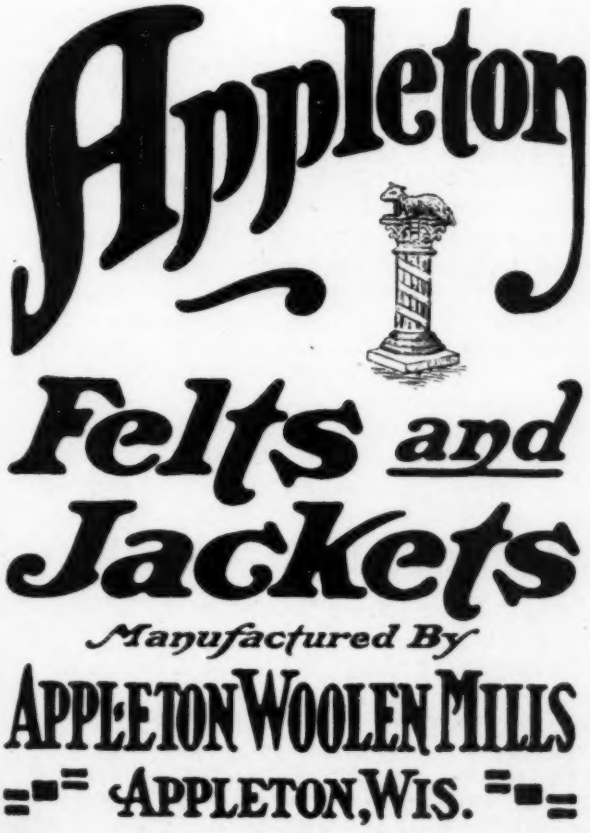
29 BROADWAY
New York, N.Y.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Felts and
Jackets
Manufactured By
APPLETON WOOLEN MILLS
APPLETON, WIS.

Largest producers in the world of highest grade Brimstone —guaranteed 99% pure—free of Arsenic and Selenium.
The
UNION SULPHUR
COMPANY
In so far as possible we will be glad to offer advice or suggestions to prospective buyers who are using or may be contemplating the use of brimstone.
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NEW YORK

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MOSINEE, WISCONSIN
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Cut down *excessive* wrapping paper investment. Why carry two wrapping paper lines for one wrapping paper *purpose?*

MOSINEE

presents a perfect wrapping paper, weight and strength for each wrapping purpose. Made in all weights from 15 pounds to 100 pounds basis. The one complete, standardized and economical line of wrapping paper sold.

Mosinee Kraft

"The Wrapper that Delivers the Goods"

ments from two or more different sources. The most important qualification for newsprint paper is undoubtedly freedom from breaks so as to permit the printing press to run at its maximum speed.

By the installation of the Autographic Press Recorder (illustrated above) in connection with the Automatic Paper Break Stop it is possible to obtain automatically an accurate record of every break that occurs in the web. This record of the web breaks in turn would indicate the relative value of different consignments of paper, or of different rolls of paper in a given consignment. The record is made in visual form on a chart, showing not only the actual number of web breaks that occur, but also the actual hour and minute of the day that such breakages take place.

Effect of Age on Casein Glues

That casein glues can be successfully used any time after mixing up to the time they become unworkable is the conclusion drawn from a number of tests at the Forest Products Laboratory. Ordinarily casein glues exhibit a life of from 3 to 5 hours, though there are some which remain usable over a much longer period. The laboratory has from time to time received inquiries as to whether or not these glues could be relied upon to give as satisfactory strength and water resistance after three or more hours as they do immediately after mixing.

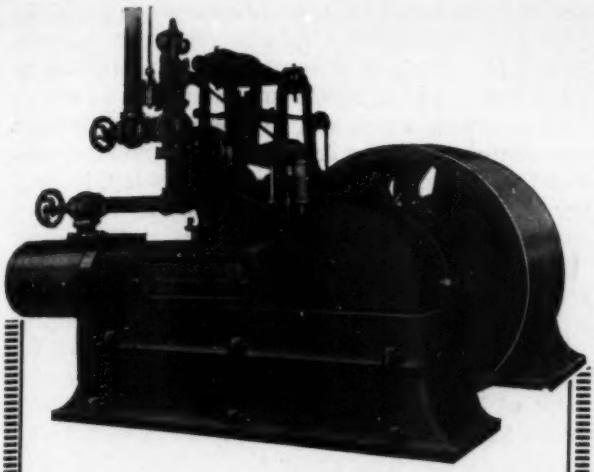
To study this question, shear blocks and plywood panels were made up hourly starting at the time the glue was mixed and continuing until the glue became so thick that it was unworkable. The blocks were allowed to season for 7 days and were then tested in shear in the usual manner; the panels were given shear tests, 8-hour boiling tests, and 10-day soaking tests. Results of the tests on one commercial glue are shown in tables 1 and 2. These are typical of the results obtained with other glues.

Table 1. Results of Joint Strength Tests.

Age of glue in hours	Average shearing strength in lbs. sq. in.	Percentage of wood surface in failure
½	2170	24
1½	2137	51
2½	2276	58
3½	2453	3
5	2098	23

Table 2. Results of Plywood Water Resistance and Strength Tests.

Age of glue in hours	Condition after boiling 8 hours	Condition after soaking 10 days	Av. shearing strength in lbs. sq. in.
½	O.K.	O.K.	261
1½	O.K.	O.K.	289
2½	O.K.	O.K.	349
3½	O.K.	O.K.	294
5	O.K.	O.K.	257



Variable and Constant SPEED ENGINES

Paper Mill Economy is assisted very materially by the installation of High Grade Variable Speed and Constant Speed Engines.

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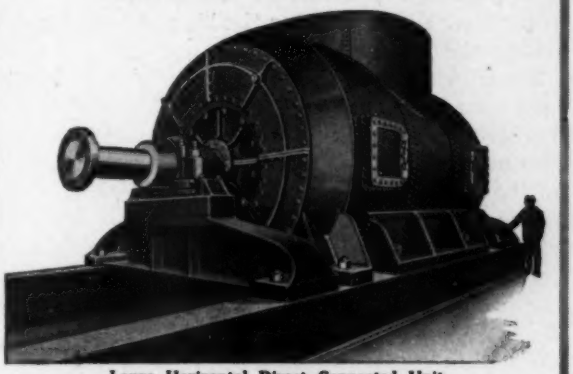
CHANDLER & TAYLOR COMPANY
Indianapolis, Indiana

Leffel Turbine Water Wheels

High Speed — High Horsepower — High Efficiency

Vertical and Horizontal Designs



Large Horizontal Direct Connected Unit

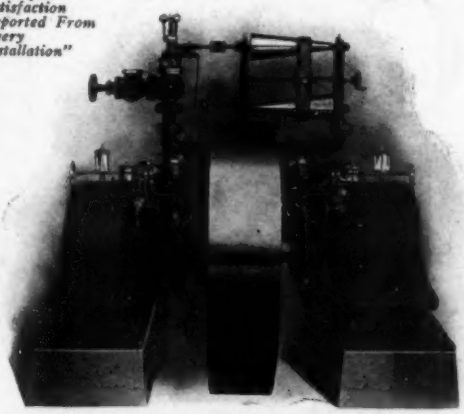
Write for Bulletin 54

The JAMES LEFFEL & CO.
SPRINGFIELD, OHIO

SALES ENGINEERS
B. F. Groff, 556 Woolworth Bldg., Lancaster, Pa.
L. B. Dow, Inc., 79 Milk Street, Boston, Mass.
H. H. White, 1503 Fourth Nat'l Bank Bldg., Atlanta, Ga.
William Hamilton Co., Ltd., Peterboro, Ont., Canada.

Large, Modern Designed ENGINES

"Perfect Satisfaction Reported From Every Installation"



Economy—Continuity of Performance—Ease of Care and Adjustment—Infrequency of Repairs

These, the important requirements of an engine, are met by "ERIE" double variable speed engines.

To the Paper Mill Trade

We will be glad to furnish full information as to price, delivery and equipment to meet your requirements, and will appreciate an opportunity to furnish these details by mail and the privilege of personal interviews being arranged.

MANUFACTURED BY
ERIE ENGINE WORKS *Established 40 Years* **Erie, Pa.**

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New York—W. B. Connor, Inc., 90 West Street.
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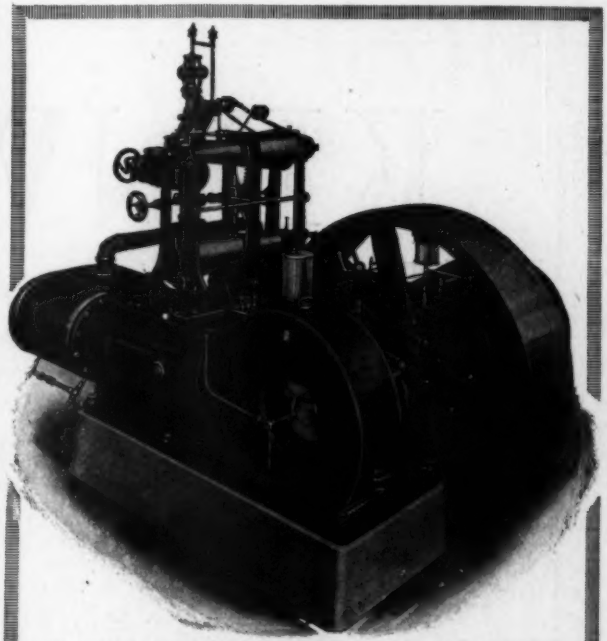


VARIABLE SPEED ENGINE

These engines are well known for
SERVICE, ECONOMY AND SPEED CONTROL

Send for Bulletin E-4

THE BROWNELL CO. **Dayton, Ohio**

Meeting of the American Pulp and Paper Association

The American Pulp and Paper Association meeting on November 12, 13 and 14 at the Waldorf-Astoria Hotel, New York City, was the biggest meeting ever held by the Association.

The unusual situation, in regard to labor and forest supply, resulted in the devotion of a large portion of the business meeting to these two important issues. Two new divisions of the Association held meetings for the first time in conjunction with the parent body. They are the Cost Association of the Paper Industry, which has held preliminary meetings in Buffalo and Chicago, and the newly formed Salesmen's Division of the Association, which will formally organize at the conference.

The various other divisions of the Association held their meetings Wednesday and Thursday, while the main business conference was held on Friday.

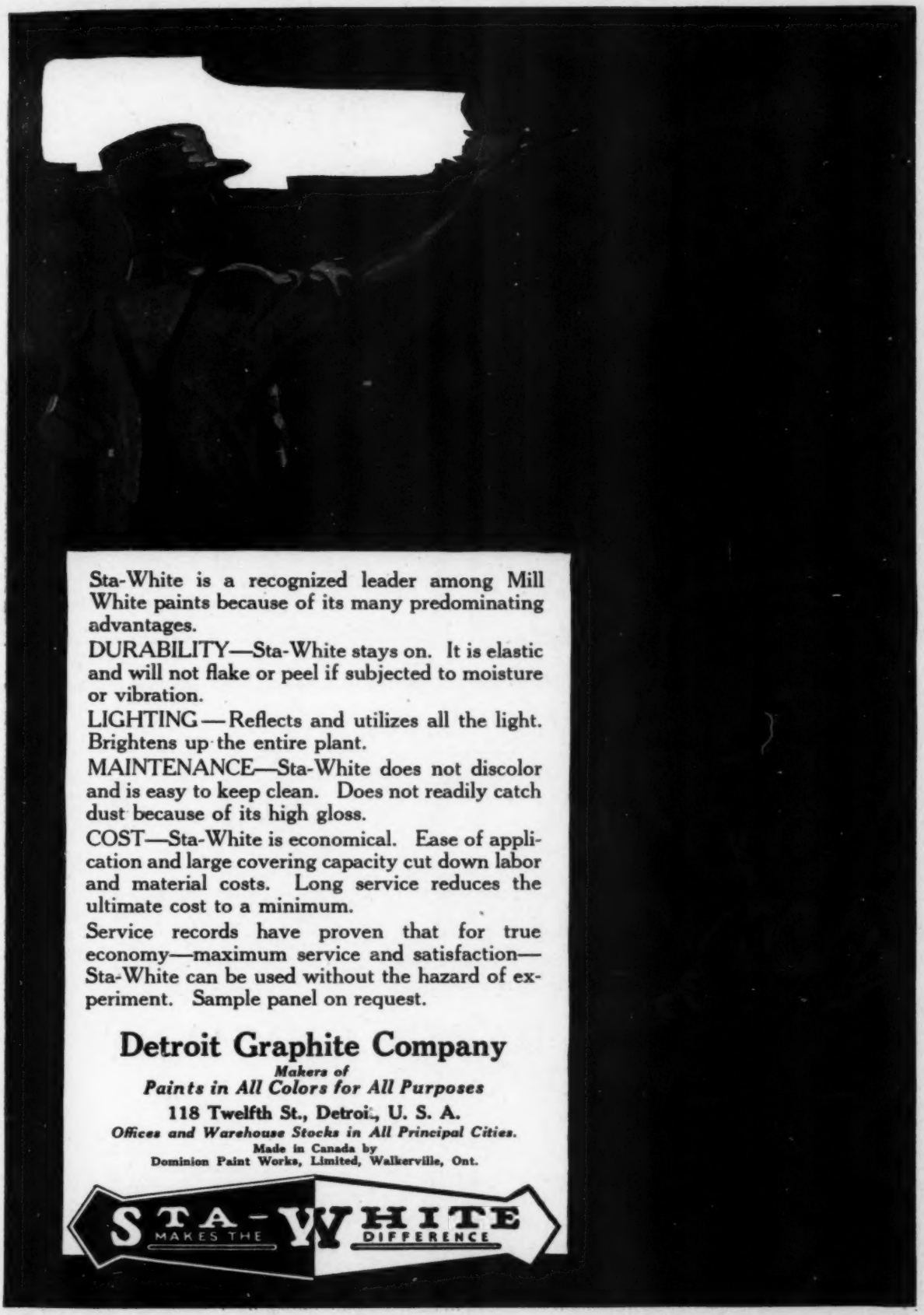
There was no banquet this fall, it being decided at a recent meeting of the Executive Committee that they would have a luncheon, followed by a discussion of the relation between employer and employees.

President George W. Sisson, Jr., in his opening address spoke as follows:

"The general labor unrest throughout the country and the constant agitation of questions affecting employment relations, most of which are discussed from the standpoint of expediency rather than of underlying principles of economics and justice, make most opportune the report and discussion on Industrial Relations, which will be presented to the business conference of the American Paper and Pulp Association at the Waldorf-Astoria, on Friday, November 14. The relation of the American Paper and Pulp Association to the National Industrial Conference Board, which has taken such prominent part in the study of these matters and which has been recognized as the scientific body representing the employing interests of the country, will make a recital of the situation from the broad-minded employer's standpoint of intense interest and value to our industry. There has been some misinterpretation of the attitude of the employer group at the recent Industrial Conference at Washington, and as there are present gentlemen of national reputation who participated in the Washington conference, they can give us first-hand and correct information of this attempt to clarify the issues that underlie sound employment relations.

"Probably no convention of the pulp and paper interests of this country ever met under circumstances of keener interest or with wider appreciation of the importance of the principal topics of discussion and study that will be the features of the program of the Business Conference on Friday.

KENWOOD
Felts and Jackets
for every kind of Paper & Pulp
MANUFACTURED BY
F. C. HUYCK & SONS
ALBANY, N. Y.



Sta-White is a recognized leader among Mill White paints because of its many predominating advantages.

DURABILITY—Sta-White stays on. It is elastic and will not flake or peel if subjected to moisture or vibration.

LIGHTING—Reflects and utilizes all the light. Brightens up the entire plant.

MAINTENANCE—Sta-White does not discolor and is easy to keep clean. Does not readily catch dust because of its high gloss.

COST—Sta-White is economical. Ease of application and large covering capacity cut down labor and material costs. Long service reduces the ultimate cost to a minimum.

Service records have proven that for true economy—maximum service and satisfaction—Sta-White can be used without the hazard of experiment. Sample panel on request.

Detroit Graphite Company

Makers of
Paints in All Colors for All Purposes

118 Twelfth St., Detroit, U. S. A.

Offices and Warehouse Stocks in All Principal Cities.

Made in Canada by
Dominion Paint Works, Limited, Walkerville, Ont.

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MAKES THE DIFFERENCE

BERMINGHAM
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Kalamazoo, Michigan

PAPER
Distributors

Let us submit an estimate on your next

Catalog
Booklet
Broadside
or Magazine

MAKE THE HANDLING OF

Parchment
Profitable to You

¶We have prepared Samples, put up in neat cartons, for the Jobbing Trade.

¶If you have not received a set we will gladly send one.

ALSO
Special Price Lists
FOR YOUR SALESMEN

SUTHERLAND PAPER CO.
Makers of
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P.C.Co.
The Symbol of Quality

P.C.Co.
The Symbol of Quality

LAKESIDE PAPER COMPANY
NEENAH, WISCONSIN

"Our name stands for Quality"

We are manufacturers of Bonds, Bible, Book, Catalogue, Eggshell, English Finish Opacity, M. F. and S. & S. C. French, Myriad Manifold, Tiffany Bond, Glazed, Unglazed, and Embossed, Gaza Onionskin, R. R. Writing, Writing Manila, High Cliff Mimeograph, White and Colored Laid Flats. Also other light and heavy weight M. F. and S. & S. C. specialties.

Quality
and
Service

From a Jobber:

"We are enclosing an order for two additional cars and think it would be well to add that your paper has been running very satisfactory and that it will probably be some little satisfaction to you to know that we are thoroughly satisfied with this sheet and think it well to give you a word of praise."

THE PRODUCTS OF INDIVIDUALITY

LABOR disturbances in the printing trade in the East, the strike of coal miners and other deterrent factors have had the effect of slowing up business in paper somewhat, yet the market exhibits, from every standpoint, a very firm undertone, and such changes in prices as have occurred have invariably been in an upward direction. Manufacturers are not feeling the quieter demand to any material degree, this being mainly a local condition more noticeable to the jobbing trade. Mills virtually without exception continue to operate at full capacity on back orders, and the great majority still have enough business on their books to keep them fully engaged for several months.

All reports agree that the paper industry is in a flourishing condition, and indications are that it will remain so for some time. Consumers are using large tonnages and consequently are obliged to make heavy demands upon manufacturers for supplies. As illustrating the increasing consumption of paper and the growing shortage of some grades, may be cited the measures which are being adopted by newspaper publishers, many of whom in various parts of the country are limiting the size of their issues and who are daily excluding columns upon columns of advertising matter owing to their fear that if they do not husband supplies the situation may become such where they will have no paper to print on. In this connection it can be said that available supplies of news print paper have reached a stage dangerously near total depletion. Offerings of spot lots of roll news have almost entirely disappeared and transient buyers are experiencing extreme difficulties in filling their wants. Prices have steadily advanced until 6 cents per pound at mills is the recognized market quotation on spot lots of roll news print.

Fine papers also are in a firm market position. One of the strongest factors in the writing paper situation at present is the large export business being conducted by American manufacturers with South American and other countries. Statistics just at hand give a good insight into the growth of the paper business in this direction. During the first seven months of 1919 exports of writing paper and envelopes amounted in value to $10,355,252, as compared with exports for the corresponding period of 1918 of $3,058,550, and in 1917 of $1,772,467. These figures show that fine paper manufacturers are effecting the heaviest foreign business in the history of the industry in America.

Wrapping and other coarse papers are sought in extensive volume and at steady prices. In fact, the volume of business transacted in these grades during the past few months has exceeded all previous records. One cardinal reason for this has been the policy pursued by retail merchants all over the country in stocking up with paper in preparation for a record-breaking pre-holiday trade. And sufficient is it to say that all signs point to their having need for every pound of paper they have bought for use between now and the turn of the year.

Tissues also are firm and moving in consistent fashion. Cover papers are in ready demand, while book papers maintain their strong tone notwithstanding the strike of printers in eastern cities, which, under different conditions, might have seriously injured the market. As circumstances were, mills producing book papers were so loaded with orders that they have scarcely noticed any effects from the temporary decrease of consumption in strike centers.

Boards of all kinds are in good demand and prices rule steady. Most manufacturers are now engaged in filling back orders.

News Personals

James J. Sullivan, for thirty-one years Chicago Manager for The Hooven, Owens, Rentschler Company, Steam Engine builders, Hamilton, Ohio, died on Thursday, October 23d, at the age of seventy-eight. His death came after a short illness.

Mr. Sullivan had a wide acquaintance in paper mill circles.

Henry E. Balsley has been appointed Chicago Manager for The Hooven, Owens, Rentschler Co., Steam Engine builders, Hamilton, Ohio, with offices at 1127 Marquette Bldg., to succeed Mr. James J. Sullivan, deceased.

Cheater Cheated by Cheater in Big Fraud

The "maddest" man in all Chicago last week was Thomas B. Hennessey, superintendent for the Barrett Company at Peoria, who a few days ago admitted cheating his employer. He had conspired with Edward Simon, a wholesale rag dealer at 670 W. Erie St., Chicago, he said, to overcharge his firm and cheat it on grades of rags.

Hennessey admitted that for eighteen months he and Edwards had systematically cheated the firm on a 50-50 basis. But last night at the detective bureau he learned for the first time that the $10,000 he got was only a fraction of his share. The firm had been cheated out of $540,000, and he himself, one of the cheaters, had been cheated out of $260,000.

HIGH GRADE

Paper Manufacturers' Supplies

Chemical and Mechanical Wood Pulp

IMPORT — EXPORT

RAGS—PAPERSTOCK
ROPE—BAGGING
STRINGS

INQUIRIES INVITED

E. B. THOMAS & CO.

INCORPORATED

ALFRED J. MORAN, Manager

100 Hudson St., NEW YORK

FRANCIS HUGHES COMPANY

Paper Mill Supplies

CORRESPONDENCE SOLICITED

Private Switch on C. B. & Q. Tracks

21st Street at Loomis
CHICAGO, ILLINOIS

Main Paper Stock Co.

Incorporated

PACKERS OF WASTE PAPER STOCK

Old and New Rags, Bagging, Strings, Etc.

Importers—Exporters

Daily Capacity 300 Tons

Branches:
321 Pearl Street
423 East 132nd St.

General Offices and Warehouses:
25-31 Peck Slip, New York

Boston (Mass.) Office— 10 High St.
Holyoke (Mass.) Office—206 High St.

Established 1885 *LONG DISTANCE PHONES Harrison 5557-2840*

—*To* PAPER Manufacturers

Here is a message of interest for you.

¶ We pack forty different grades of Paper Stock.

¶ Our Daily Capacity is 300,000 pounds.

¶ We can give you both Quality and Quantity.

Send us your inquiries on the grades you want to use in your product.

MENDELSON BROS. PAPER STOCK CO.

General Offices, STANDARD OIL BUILDING
910 South Michigan Boulevard, CHICAGO

"The house with whom you eventually will trade"

DANIEL M. HICKS

(INCORPORATED)

IMPORTERS-DEALERS

ESTABLISHED 1895

Foreign and Domestic

Rags, Bagging, Rope and Waste Paper

140 NASSAU ST. NEW YORK U.S.A.

SCREEN PLATES *and* DANDY ROLLS

Watermarking a Specialty

Central Manufacturing Co.

The Quick Service House

KALAMAZOO MICHIGAN

Papermaking Rags

Notwithstanding somewhat of an improvement in demand for most kinds of papermaking rags, prices in a good many cases have eased off a bit further, this being due presumably to the failure of consumers to buy in heavy enough volume to sustain values. Mills in frequent instances have been obliged to come into the market for larger quantities of domestic rags owing to the longshoremen's strike in New York and the resultant delay in deliveries of foreign stock coming in at this port, but the increase in demand has involved principally the low qualities of rags which seemingly are held in sufficient volume to more than cover buyers' wants. Roofing rags are moving freely and at firm prices, some mills having advanced their quotations a shade over previous levels, and there is also a fairly consistent inquiry for No. 1 packing of old whites. Thirds and blues and most grades of new cuttings, on the other hand, are in slight call and prices are generally at a decline. Black stockings and cotton batting also are quotably lower. Prices follow:

New Stock—	
White shirt cuttings, No. 1	14.50-15.00
White shirt cuttings, No. 2	9.00- 9.25
Fancy shirt cuttings	11.00-11.25
Washables, No. 1	8.50- 8.75
Unbleached muslins	12.00-12.00
White lawns	13.50-14.00
Overall cuttings, blue	11.00-11.25
Black silesias	6.75- 7.00
Old Stock—	
Whites, No. 1 repacked	7.25- 7.50
Whites, No. 2 repacked	5.50 5.75
Whites, house soiled	3.75- 4.00
Whites, street soiled	3.25- 3.50
Thirds and blues, repacked	3.75- 4.00
Thirds and blues, rough	3.25- 3.50
Black stockings	3.00- 3.15
Lace curtains	7.00- 7.25
Cotton canvas, No. 1	5.00- 5.25
White cotton batting	5.00- 5.25
Roofing, No. 1	2.70- 2.80
Roofing, No. 2	2.60- 2.70

Rope and Bagging

Demand for old bagging is at a very low ebb and while there is slightly more trade activity in old rope than was in evidence several weeks ago there is still a marked lack of concerted demand from consuming sources. Mills using these materials, with few exceptions, seem to have present requirements well taken care of and are interested in additional supplies only when enabled to secure them at attractive prices. No. 1 scrap bagging is offered by dealers at 2.75 cents a pound f. o. b. shipping point, and there are few buyers in the market at this or lower prices. Old Manila rope of No. 1 quality is selling at around 6 cents. Quotations are:

	New York and Chicago
Gunny, No. 1 domestic	3.25-3.50
Gunny, No. 1 foreign	3.25-3.50
Scrap bagging, No. 1	2.75-3.00
Roofing bagging	2.30-2.40
Wool tares, heavy	3.50-3.75
Wool tares, light	3.25-3.50
Manila rope, No. 1 foreign	6.00-6.25
Manila rope, No. 1 domestic	6.00-6.25
Sisal strings	3.25-3.50
Mixed strings	2.50-2.60

Old Papers

Buying of the low grades by board manufacturers is the life of the old paper market. Folded newspapers, overissue news, mixed paper and similar grades are moving in good tonnages and at firm prices, but high qualities are sought in scattered directions and in limited amounts. Evidently consumers of shavings, old books and magazines and kraft paper are relying more on wood pulp than ordinarily despite the fact that prices on these kinds of waste paper have receded to a point where appreciable savings could be effected by substituting them for primary material. For example, old No. 1 kraft paper is offered freely at $65 per ton at the shipping point by packers, whereas about the cheapest price quoted on kraft pulp is $80 f. o. b. mill, while No. 1 soft shavings are available at $80, against a cost of at least $95 for soda pulp. A strong item in the market is white newspaper, which largely on account of the ground wood situation, is actively sought and is steadily rising in value. Prices f. o. b. point of shipment are:

	New York and Chicago
Hard white shavings, No. 1	5.25-5.50
Hard white shavings, No. 2-3	4.50-4.75
Soft white shavings	4.00-4.25
Colored shavings	1.60-1.80
Heavy book, No. 1	1.90-2.10
Crumpled, No. 1	1.70-1.80
Ledger stock	2.60-2.80
Kraft, No. 1	3.25-3.50
Manilas, No. 1	1.40-1.50
White blank news	2.00-2.15

"TYLER"
CORDUROY CLOTH
for SAVEALLS
GROUND WOOD WET MACHINES
WATER FILTERS
SULPHITE WET MACHINES

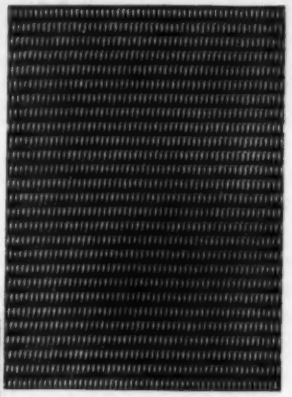
Tyler Corduroy Cloth, for use in the paper making industry, has four distinct advantages over other types of screen, namely:

1—It eliminates the necessity of using backing wires.
2—It gives much longer life than fine face wire.
3—There is no chance for stock to collect between the two covers which occurs where a fine wire and a backing wire are used.
4—Eliminating the backing wire, saves considerable time in applying the cloth to the machine.

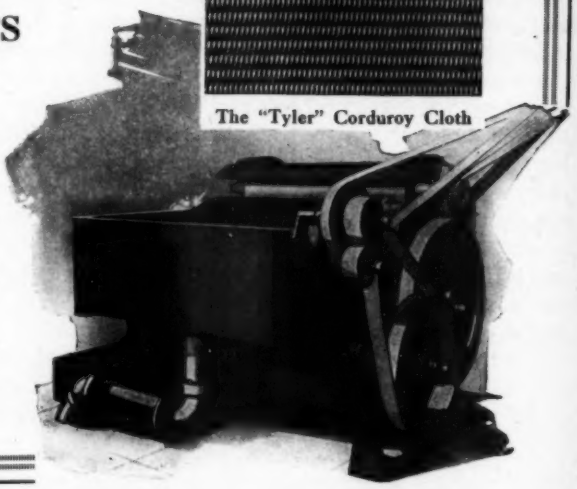
Tyler Corduroy Cloth is made from phosphor bronze, monel, or nickel wire, and is carried in stock in all widths up to and including 150 inches.

Samples will be sent upon request.

Also Manufacture Fourdrinier Wires, Cylinder Faces, Washer Wires, Backing Wires



The "Tyler" Corduroy Cloth



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Plain Strawboard
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Book Lined Strawboard
Plain and Lined Chip Board
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Clay Coated Folding Box Board
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Brown Jute Box Board
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Diamond Wall Board
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Also other standard and special grades to order

UNION SCREEN PLATE CO.
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UNION BRONZE SCREEN PLATES
(Best phosphorized Cast Metal)

Old Plates RECLOSED and RECUT to accurate gauge
UNION BRONZE SCREWS for Screen Plates
Immediate Delivery of the Largest Orders. Satisfaction Guaranteed

The Witham Screen Plate Fastener, Patented
THE ORIGINAL THE BEST

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NORTHERN CRANES
and ELECTRIC HOISTS Catalogs Free

NORTHERN ENGINEERING WORKS. DETROIT, MICH.

Overissue news, No. 1	1.25-1.35
Folded news	.85- .95
Mill wrappers	1.00-1.10
Box board cuttings	.80- .90
Mixed paper, No. 1	.75- .85
Common paper	.60- .70

News Personals

The Berton C. Hill Company, of 501 Fifth avenue, selling agents for a number of paper and board mills, including the Wolverine Paper Company, White Pigeon Coated Paper Company, Wheat Paper Company, Bardeen Paper Company and American Coating Mills, has been incorporated under the laws of New York State with a capitalization of $50,000.

The Chatfield & Woods Company, paper merchants of Cincinnati, O., and branches in other cities in the Middle West and East, has opened a New York office in the Fifth Avenue Building, 200 Fifth avenue, with J. Arthur Hayes in charge.

The Royal Card & Paper Company, among the largest jobbing firms in the metropolitan area, has increased its capital from $150,000 to $300,000.

Albert N. Pirman, for the past fifteen years associated with J. Andersen & Company and the Pulp and Paper Trading Company, of this city, has organized the American Sulphite Pulp and Paper Company, Inc., to deal in chemical and mechanical wood pulps of all kinds and all grades of paper. Offices have been established at 27 East Twenty-second street. Mr. Pirman is widely known in local trade circles and among paper manufacturers and his many business friends predict much success for him in his new venture.

New York, November 15.—A hearing on the appeal of the United States Attorney General in the controversy over the price of news print paper was held in the United States Circuit Court of Appeals in this city last month before Judges Ward, Hough, Rogers and Manton, who reserved decision. George W. Wickersham, former Attorney General, appeared for the publishers, and Henry A. Wise represented the paper manufacturers.

Prices established by the Federal Trade Commission as of April 1, 1918, were considered unreasonable by Judges Ward, Hough, Rogers and Manton, who are acting as arbitrators, and they revised the figures as follows: Roll news in car lots, f. o. b. mill, $3.50 a cwt.; in less than car lots, f. o. b. mill, $3.62 a cwt.; sheet news in car lots, f. o. b. mill, $3.90 a cwt.; in less than car lots, $4.02½ a cwt.

The Federal Trade Commission, under date of October 18, 1919, made supplemental findings whereby the following prices were fixed as of May 1, 1918: Roll news, car lots, f. o. b. mill, $3.63¼ a cwt.; less than car lots, f. o. b. mill, $3.75¾ a cwt.; sheet news, car lots, f. o. b. mill, $4.03¼ a cwt.; less than car lots, $4.15¾. Subsequently these prices were again advanced as follows: Roll news, car lots, f. o. b. mill, $3.75¼ a cwt.; less than car lots, $3.87¾; sheet news in car lots, f. o. b. mill, $4.15¼; less than car lots, $4.27¾.

Mr. Wise asserted that the prices in force were entirely inadequate and that the prevailing market prices for news print were all the way from $5.50 to $6. In the event of a decision to restore the price of $3.50, he said, the manufacturers would be unable to realize the profit which had been named by the court. The cost of labor and freight, said Mr. Wise, has gone up during the war, and the increase in price was absolutely necessary. He said the books of the paper manufacturing companies he represented had been audited for the trade commission, and on the results of the audits the increase had been granted.

Annual Meeting and Convention Cost Association of the Paper Industry

The annual meeting and convention of the Cost Association of the Paper Industry was held at the Waldorf Astoria Hotel in New York City on November 12th and 13th.

This meeting was of the greatest importance and interest to Paper and Pulp Mill Executives and Cost Accountants as well as Executives and Cost Accountants of Converters of Paper. This association has now been organized for nearly a year and is doing constructive work for the industry.

The program was as folows: On November 12th among other things the complete cost accounting procedure of the American Writing Paper Company, Holyoke, Mass., was demonstrated by Mr. B. E. Hutchinson, their treasurer, with cost forms and cost charts available for inspection and examination. Lantern slide exhibit was used.

The cost systems of the Eastern Manufacturing Company and the Chemical Paper Manufacturing Company, which were on exhibition at the Buffalo and Chicago conventions of the association respectively, were again on exhibition with competent representatives of these two concerns on hand to answer questions and offer explanations.

Mr. Louis Von Hasslacher of the Robert Gair Company, Brooklyn, N. Y., spoke on "Cost Accounting and Profit Calculating Methods."

Other leaders in cost work in the industry presented up-to-date ideas and methods of cost accounting. Very interesting discussions followed.

On November 13th the various classified groups within the Cost Association representing the Board, Book, Cover, Tissue, Wrapping and Writing Branches of the industry met to discuss the cost problems peculiar to their respective branches of the industry and to further develop the "Co-operative Idea."

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Paper Manufacturers' Supplies
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ATLANTIC PAPER & PULP CORP.
Savannah, Ga.
KRAFT PULP

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WM. A. HARDY & SONS
FITCHBURG, MASS.
Originators and Oldest Manufacturers
OF THE
Cast Bronze Screen Plate
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CHEMICAL WOOD PULP *of* **ALL KINDS**

Dealers in
Domestic Sulphites, Kraft Pulps and GROUND WOOD

Agents for **PAPER MILL SUPPLIES**

New Papers

Writing—	
White rag	20-40
White sulphite, No. 1	12-20
Colored	14-23
Ledger—	
White rag	20-42
White sulphite	14-22
Colored sulphite	16-
Colored rag	22-
Bonds—	
White rag	17-47
White sulphite	13-22
Colored sulphite	14-26
Colored rag	17-50
Book—	
No. 1 S. & S. C	9.00- 9.50
Machine finished	8.50- 9.00
English finished	9.00-12.00
Coated and enamel	10.50-14.00
Lithograph, M. F	8.75-12.00
News Print—	
Rolls, contract	3.75-
Rolls, transient	5.50- 6.00
Sheets	5.25- 5.50
Side runs	4.50- 4.75
Cover Stock—	
Coated, both sides	12.25-
Coated, one side	12.20-
Wrappings—	
No. 1 kraft	8.50- 9.00
No. 2 kraft	7.75- 8.25
Boards—	New York and Chicago
Solid news	60.00-65.00
Straw	50.00-60.00
Plain chip	55.00-60.00
White coated chip	75.00-80.00
Manila coated chip	70.00-75.00
Binders board	75.00-80.00

Mechanical Pulp

With news print manufacturers and other consumers actively inquiring for supplies and with demand far in excess of available stocks owing to the sold up condition of grinders, mechanical wood pulp is in a very strong market position. Very little freshly ground wood is offered for prompt shipment, producers in the great majority of cases being obliged to turn down business because of their lack of pulp to dispose of, and such tonnages as find their way into the open market at intervals command high prices, current quotations ranging between $40 and $45 per ton at grinding mills. Most manufacturers having spot ground wood for sale are insisting on buyers taking equal amounts of freshly ground and stored pulp, and in this way are liquidating their holdings of surplus pulp accumulated in some instances as far back as a year ago.

Chemical Pulp

Probably the outstanding development in the domestic wood pulp market during the past month has been a decline in prices on kraft, which occurred suddenly several weeks ago when a considerable number of consumers dropped out of sight as buyers. Prices receded $10 per ton from a level of about $90 to $80, but since then demand has again broadened and prices are now marked by steadiness. On the whole, a fair amount of trade activity prevails. Paper manufacturers, although exerting caution, are placing orders in a consistent manner and in the aggregate are absorbing a normal volume of pulp of all grades. Bleached sulphite of No. 1 quality and news print sulphite lead in demand and offerings of these kinds of pulp are quickly taken off the market at firm prices, the former selling at 6 to 6.25 cents and the latter at 3.50 to 3.75 cents f. o. b. pulp mills. Producers appear to be sold ahead on these two grades and are offering sparsely, whereas available supplies of other kinds of pulp seem ample to fill the wants of buyers with the result there is not the strength in prices in the remainder of the list as in bleached and news print sulphite. Quotations f. o. b. pulp mills follow:

Bleached sulphite	6.00-6.50
Easy bleaching sulphite	4.50-5.00
News grade sulphite	3.50-3.75
Soda pulp, bleached	4.75-5.00
Mitscherlich unbleached	5.50-5.75
Kraft, No. 1	4.00-4.25
Screenings, refined	1.75-2.00

Chemicals

Chemicals of all kinds used by paper and pulp manufacturers are moving in steady volume and prices are maintained on firm levels. Export demand is active and producers are readily disposing of their output among domestic and foreign buyers. Quotations are:

Alum, lump ammonia	4.00- 4.25
Alum, lump starch	8.50- 9.00
Alum, powdered	4.25- 4.50

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Special Attention Called to Our Own Packing and Assortment

White's Chipper Knives

Why Better?

Because they wear longer and are backed by our 82 years of experience in tempering and our experience in suiting some of the largest paper mills in the world. *Hadn't you better write us?*

The L. & I. J. White Co.
85 Columbia Street BUFFALO, N. Y.

Reasons for using our domestic

Washed Clay

QUANTITY: Largest production in United States.

QUALITY: Lowest grit and moisture contents of any clay, domestic or foreign.

DELIVERIES: Reserve stock never under 6000 tons.

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CRUDE CLAY: Paragon and Excelsior Brands.

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NEW YORK OVERSEA CO. Inc.
Importers and Exporters of
WOOD PULP and PAPER
Offices located all over the World
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Blanc fixe	4.25- 4.50
Bleaching powder (domestic drums)	2.25- 2.50
Brimstone (ton)	18.00-20.00
Casein	14.00-17.00
Caustic soda	3.00- 3.25
China clay, domestic, washed	11.00-12.00
China clay, foreign	15.00-20.00
Rosin, grade E	17.00-17.10
Satin white	2.25- 2.50
Soda ash, 58 per cent light (bags)	1.90- 2.00
Sulphite of alumina, commercial grade	1.75- 2.00
Starch, Globe, in bags	5.87-
Talc (ton)	12.00-15.00

Foreign Trade Opportunities

A firm in Greece desires to secure agencies for the sale of paper. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 30593.

A Spaniard, who is now in this country, is soon to sail for South America, and desires to secure agencies from manufacturers of supplies for the printing, binding and box-making industries, such as paper, type, machinery, etc. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 30594.

A firm in Argentina having a factory and store for the manufacture and sale of paper, cardboard and kindred lines desires to represent manufacturers in these lines. Correspondence may be in English. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 31037.

Importers in Turkey are in the market for packing paper, writing and cigarette papers and other paper, for which there is an urgent demand. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 31038.

An American export company, having a branch office in Spain, desires to secure an agency from manufacturers for the sale in Spain and Portugal of fiber board suitable for shoe counters and inner soles. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 31039.

A company in India desires to purchase and secure agencies for the sale of paper and stationery. Payment through banks in India. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 31000.

A firm in Colombia wishes to obtain the representation of a few exclusive lines. It desires to represent only four or five large houses, and to the one or two which they already have they wish to add agencies for heavy chemicals and paper products. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 31093.

An agency is desired by a man in the Dominican Republic for the sale of paper. Terms, 60, 90 and 120 days sight draft against documents. Correspondence should be in Spanish. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 31064.

News Personals

The Continental Paper Bag Company, of New York, has purchased the Marinette and Menominee Paper Company's mills at Marinette, Wis., and Menominee, Mich. The purchase includes large water powers on the Menominee River, two paper mills, two sulphite plants, two ground wood mills and other real estate and timber lands.

The Bergen Paper Company, of which Darmstadt, Scott & Courtney, of 178 South street, New York, are the proprietors, has disposed of its roofing paper mill at Little Ferry, N. J., to the Flintco Company, of Rutherford, N. J., which, it is understood, will continue to operate the plant for the manufacture of deadening and saturating roofing felts. The mill has a capacity of about 50,000 pounds of felt daily.

Martin Spinelli, dealer in papermakers' supplies at 132 Nassau street, returned several days ago from an extensive trip through the Middle West, and reports mills in that section to be busily engaged.

The Neura Paper Company, of New York, has increased its capital stock from $600,000 to $1,200,000. This company, in which Joseph Gatti, of the Gatti-McQuade Company, is interested, was organized some months ago to operate a paper mill up the Hudson River.

A new concern recently entered into the local jobbing trade is the A. W. Pohlman Paper Company, which was organized and incorporated several weeks ago to do a retail business in writing, cover and book papers at 62-64 Gold street. The company is capitalized at $20,000, and Arthur W. Pohlman and A. M. Juby, its organizers, are well known locally, both having formerly been connected with the selling force of Paul E. Vernon & Company.

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Canadian Kraft, Ltd.
Dealers in Wayagamack Kraft
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PAPER MAKERS' SUPPLIES
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The Stickle Automatic Steam Control for Paper Machines

WE wish to emphasize the word "automatic." This with us means that the steam follows changes that come to the sheet from free to hard drying stock or any ordinary changes in weights. A control that does not do this in itself is not automatic. This makes a better sheet of paper. We guarantee to hold the moisture at any point you wish with ½ of 1% change. Furnished on 60 days' approval.

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INDIANAPOLIS, IND.

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30 Years Exporting American Paper

Our Markets: The World outside of U. S. A. and Canada.

Our Organization: Ten selling offices, besides salaried travellers and local representatives.

Our Demand: An established clientele, constantly being increased, by an aggressive sales policy.

Our Supply: **Your Mill?**

Present conditions in America are temporary.

Have you considered what a first-class export outlet would mean to you, with its assurance of steady demand?

Parsons Trading Company

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Mexico, D. F.
Havana
Buenos Aires
Rio de Janeiro

Chemical Pulp

Prices on chemical wood pulps in Scandinavian countries continue beyond a parity with values here and, as would be expected under the circumstances, importations are light. Import firms, in fact, are bringing in very little, if any, supply on their own behalf, most of them confining their operations to pulp purchased by consumers in this country for shipment. Latest reports from Sweden say that mills there are producing only about 50 per cent of their normal output, owing to the high cost and scarcity of raw materials and labor, while Norwegian manufacturers are reported to have reduced their production to even larger extents. Aside from a slight easing off in kraft, quotations in the local market have been firmly maintained, bleached sulphite being quoted at about 7.50 cents, No. 1 unbleached sulphite at 5 cents and easy bleaching sulphite at 5.50 cents. The drop in domestic kraft pulp prices several weeks ago also promoted a decline in foreign kraft, and the latter is now quoted at around $85 per ton. Receipts during the past month and current quotations are:

Bleached sulphite	$7.50-8.00
Unbleached sulphite, No. 1	4.75-5.00
Easy bleaching	5.25-5.50
Mitscherlich unbleached	5.75-6.00
Kraft	4.25-4.50

J. Andersen & Co., 3,500 bls. from Christiania, 1,200 bls. from Gothenburg. M. Gottesman & Co., 250 bls. from Christiania. Scandinavian-American Trading Co., 2,330 bls. from Gothenburg. American Woodpulp Corp., 4,125 bls. from Gothenburg, 2,567 bls. from Skutskar. A. J. Pagel & Co., 1,200 bls. from Gothenburg, 1,000 bls. from Copenhagen. New York Oversea Co., 2,400 bls. from Gothenburg. Nilsen, Rantoul & Co., 3,000 bls. from Sikea. National Bank of Commerce, 3,600 bls. from Ohrviken. Tidewater Paper Mills, 7,243 bls. from Liverpool, N. S. Order, 4,500 bls. from Christiania, 2,305 bls. from Gothenburg.

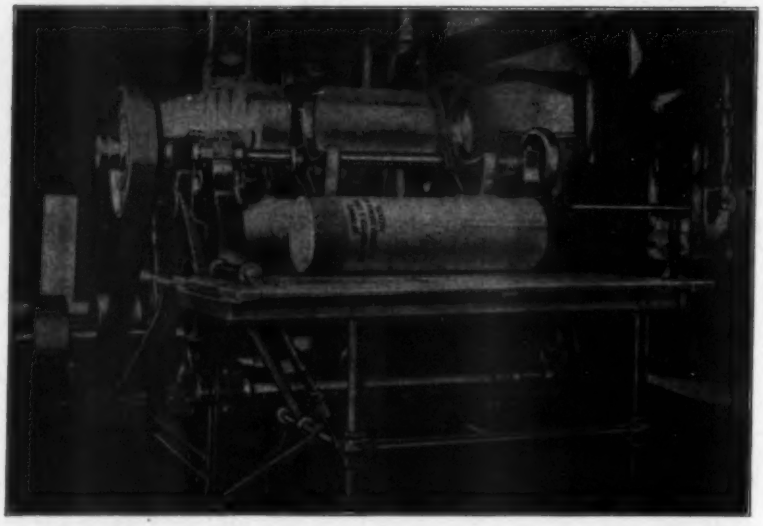
Paper Stock

The influx of foreign papermaking material continues heavy and large shipments of rags, old rope and bagging are arriving almost daily. With longshoremen in New York out on strike, these materials have been accumulating on the docks and in the local harbor until there is doubtless greater quantities now held here than ever before at one time. The bulk of these supplies are owned by mills, having been sold by importers and dealers to arrive; nevertheless there are appreciably large amounts still to be absorbed by consumers, which is probably accountable for the slight easing off of prices in the face of a rising market on the other side of the Atlantic.

Rags

Certain-Teed Products Corp., 2,489 bls. from Antwerp, 836 bls. from Hull, 82 bls. from Rotterdam, 404 bls. from Ghent. Castle, Gottheil & Overton, 22 bls. from Antwerp, 1,176 bls. from Rotterdam, 434 bls. from Hull, 38 bls. from London, 282 bls. from Bordeaux. Foreign Trade Banking Corp., 75 bls. from Antwerp, 619 bls. from Rotterdam, 105 bls. from Hull. Brown Bros. & Co., 1,914 bls. from Antwerp, 175 bls. from Rotterdam, 295 bls. from Hull, 133 bls. from Rouen. R. F. Downing & Co., 724 bls. from London, 2,119 bls. from Rotterdam. Albion Trading Co., 252 bls. from London. Irving National Bank, 99 bls. from London, 149 bls. from Rotterdam, 708 bls. from Antwerp, 54 bls. from Leith. Kidder, Peabody & Co., 537 bls. from Hull, 71 bls. from Bordeaux, 163 bls from Rouen. Goldman, Sachs & Co., 98 bls. from Hull, 101 bls. from Rouen, 793 bls. from Antwerp. Jebb Bros., 312 bls. from Hull, 50 bls. from Antwerp. National City Bank, 78 bls. from Hull. Salomon Bros. & Co., 254 bls. from Hull, 743 bls. from Rotterdam. Frank & Berg, 1,134 bls. from Rotterdam. Battery Park National Bank, 1,542 bls. from Rotterdam. E. J. Keller Co., 1,028 bls. from Rotterdam, 66 bls from Rouen. Paul Berlowitz, 217 bls. from Rotterdam. Ladenburg, Thalman & Co., 359 bls. from Rotterdam. Davies, Turner & Co., 241 bls. from Antwerp. Wilkinson Bros. & Co., 816 bls. from Rotterdam, 187 bls. from Hull. Kelly & Co., 874 bls. from Rotterdam. Edwin Butterworth & Co., 470 bls. from Rotterdam, 280 bls from Antwerp, 66 bls. from Rouen. George W. Millar & Co., 224 bls. from Rotterdam. F. W. Bird & Son, 813 bls. from Rotterdam. Guaranty Trust Co., 44 bls. from Rotterdam. H. F. Hejman, 454 bls. from Antwerp. American Express Co., 163 bls. from Bordeaux. A. Salomon, Inc., 157 bls. from Hull, 44 bls. from Antwerp. Maurice O'Meara Co., 600 bls. from Rotterdam. R. Goldstein & Son, 411 bls. from Rotterdam. Atterbury Bros., 560 bls. from Rotterdam, 287 bls. from Hull, 134 bls. from Rouen. British Bank of South America, 68 bls. from Manchester, 228 bls. from Antwerp. Sanderson & Son, 188 bls. from Hull. Order, 1,372 bls. from Antwerp, 499 bls. from Hull, 898 bls. from Bordeaux, 181 bls. from London, 1,654 bls. from Rouen.

EFFICIENCY IN WRAPPING ROLLS



is only obtainable by the use of the

Power Roll Wrapper

Wraps and stencils Rolls at a saving of from fifty to seventy-five per cent.

Nekoosa Motor & Machine Company

Manufacturers and Sole Agents NEKOOSA, WIS., U.S.A.

WHEN you buy a water heater, or anything else for that matter, you do not actually buy a water heater, but what it will do.

"SIMS" Open Feed Water Heater, Filter and Purifier is the product of Modern Engineering Science and has met the demand for greater efficiency.

OPEN FEED construction is the most simple and effective principle of feed water heating and has less maintenance troubles and operating costs than any other type.

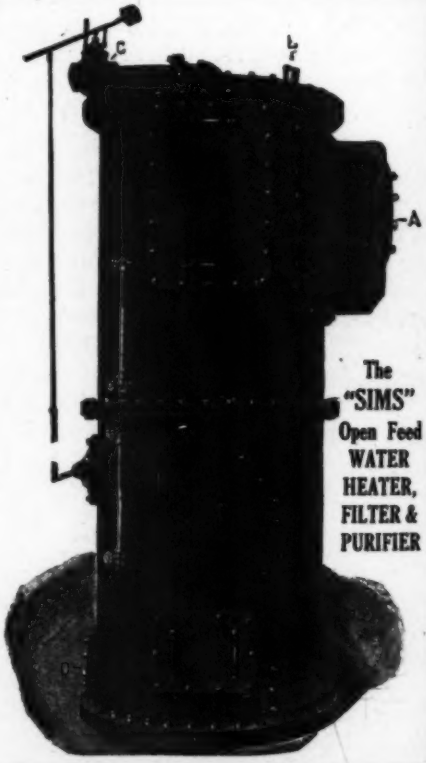
WATER HEATER feeds your boilers with hot water, reduces the strain from contraction and expansion due to feeding cold water and effects a saving of approximately 14.5% in fuel.

FILTER and PURIFIER the feed water in a filtering chamber containing hard coke of suitable size as the filtering medium.

Water containing earthy matter and carbonate of lime when heated close to the boiling point is thrown out of solution into suspension and is removed by the filter.

Is installed you GET the service you bought

Ask us about the "Sims" feed-water heaters.



The "SIMS" Open Feed WATER HEATER, FILTER & PURIFIER

THE SIMS COMPANY

"We Keep Others in Hot Water."

ERIE PENNA.

The Michigan Meeting

The Michigan Division of the American Pulp & Paper Mill Superintendents' Association convened at the Park-American Hotel, Monday evening, October 20, for dinner and an instructive program following. It proved to be the most enthusiastic gathering yet held by this progressive organization.

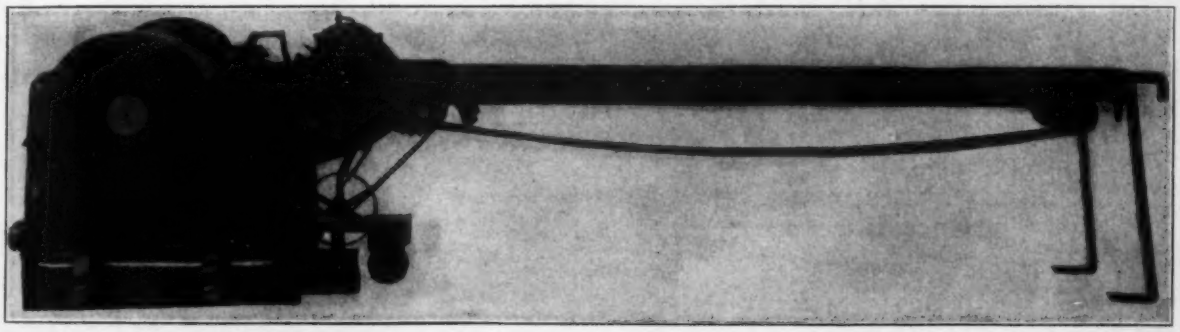
Three subjects were considered during the evening. G. E. Phisterer, of the Green Fuel Economizer Company, talked on "Power Production and Distribution." C. W. Rieser, chief chemist of the Western Paper Makers' Chemical Company, read a paper on "Rosin Sizing of Papers." Cole Stickle, of the Open Coil Heater and Purifier Company, Indianapolis, considered "The Drying of Paper." These papers appear in full in this issue.

Those present were C. W. Ulrich, Wolverine Paper Company, Otsego; H. W. Reynolds, R. & J. Dick, Ltd., Chicago; C. P. Davis, Macsimbar Paper Company, Otsego; A. G. Wightman, Hawthorne Paper Company; W. J. Lawrence, Western Paper Makers' Chemical Company; P. A. Van Vlack, Moser Paper Company, Chicago; J. H. O'Connell, King Paper Company; C. H. Noble, Lincoln Mills; W. H. Wightman, Lee Paper Company, Vicksburg; D. H. Zwart, Bryant Paper Company; George McGuire, Bryant Paper Company; C. W. Rieser, Western Paper Makers' Chemical Company; Peter J. Massey, "Paper Industry," Chicago; E. T. A. Coughlin, Monarch Paper Company; Cole Stickle, Open Coil Heater and Purifier Company, Indianapolis; E. H. Gilman, Bryant Paper Company; Ben Groover, Kalamazoo Vegetable Parchment Company; J. E. Winterburn, King Paper Company; Edwin L. Brezette, Monarch Paper Company; Jacob Parent, Western Board and Paper Company; W. H. Reyolds, Kalamazoo Paper Company; Grant Johnson, Western Board and Paper Company; R. M. Adams, Kalamazoo Paper Company; John Tomlinson, Standard Paper Company; E. F. Yahmke, Standard Paper Company; C. J. Chamberlain, Watervliet Paper Company, Watervliet; Frank Kress, Jr., Watervliet Paper Company; C. O. Thorne, Watervliet Paper Company; M. Redmond, Kalamazoo Paper Company; J. C. Driessen, Kalamazoo; Max Oberdorfer, Filer Fibre Company, Manistee; J. Kuss, King Paper Company; N. J. Niks Vegetable Parchment Company; F. A. Johnson, King Paper Company; G. E. Phisterer, Green Fuel Economizer Company; Howard P. Hall, Paper Trade Journal.

Kalamazoo Valley Paper Mill Cost Association will hold a special meeting at the Park American Hotel at 8 p. m. Monday, Nov. 24.

H. H. McClure, of L. V. Estes, Inc., industrial engineer of Chicago, Ill., will speak on "Cost Finding and Accountancy and Its Relation to Management."

No. 11 "GIANT" PAPER STOCK CUTTER



Capacity 2½ Tons Per Hour

Especially Adapted for Handling Waste Paper, Magazines, Etc., Before Feeding to the Beaters

Whatever You Cut, A GIANT Will Solve Your Problem

LET US FIGURE IT OUT FOR YOU

TAYLOR, STILES & COMPANY, Riegelsville, N. J., U.S.A.

WATEROUS ENGINE WORKS
Brantford, Ont., Canada
Canadian Representatives

R. J. MARX
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When You Buy a Washing and Beating Engine—What Do You Want?

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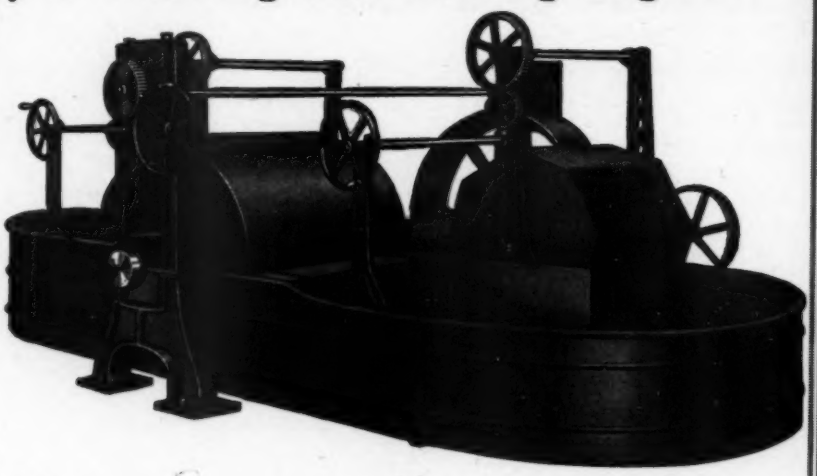
Lowest Power Consumption
Easy Regulation
Great Flexibility
Honest Construction
Minimum Upkeep
Dependable Operation



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Wood Room Beater Room and Finishing Room Equipment

OUR ENGINEERING DEPARTMENT IS ALWAYS GLAD TO COOPERATE WITH YOU

HOLYOKE MACHINE CO.

HOLYOKE, MASS.

We Build Our Machinery to Meet YOUR Requirements

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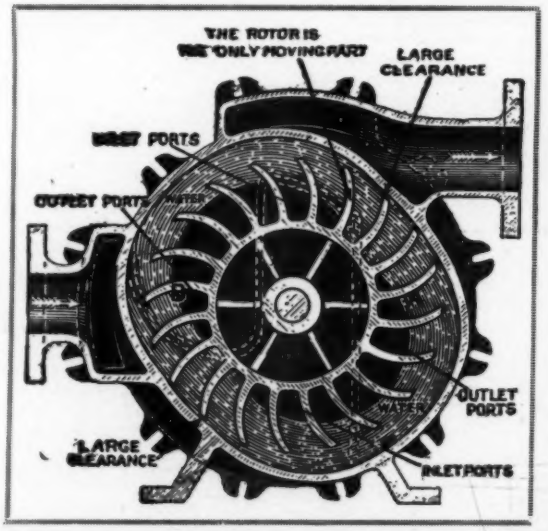

Buyers' Guide—What and Where to Buy

Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

MECHANICAL PULP (Processes)
Hall, Ward & Walker, Inc., Watertown, N. Y.

KNIVES
John W. Bolton & Sons, Inc., Lawrence, Mass.
R. J. Dowd Knife Works, Beloit, Wis.
Simonds Manufacturing Co., Fitchburg, Mass.

LAYBOYS
Moore and White Co., Philadelphia, Pa.

LIFTS
Economy Engineering Co., Chicago, Ill.

LINE SHAFT BEARINGS
The Hill Clutch Co., Cleveland, Ohio.

MACHINE DRYER TEMP. CONTROL
Open Coil Heater and Purifier Co., Indianapolis, Ind.
Valley Iron Works, Appleton, Wis.

MECHANICAL PULP
J. Andersen & Co., 21 E. 40th St., New York City.
Hart Trading Co., Inc., Tribune Bldg., New York City.
E. B. Thomas & Co., Inc., 100 Hudson St., New York City.

PAPER BOARDS
The C. L. La Boiteaux Co., 200 Fifth Ave., N. Y.
F. D. Wilson, 1520 Lumber Exchange Building, Chicago, Ill.

PAPER DISTRIBUTORS
Bermingham and Prosser, Chicago, Ill.
Seaman Paper Co., Chicago, Ill.

PAPER EXPORTERS AND IMPORTERS
American Transmarine Co., 13 Park Row, New York City.
Gatti-McQuade Co., 200 Fifth Ave., New York City.
Hart Trading Co., Inc., Tribune Bldg., New York City.
E. J. Keller Company, 200 Fifth Ave., N. Y. C.
Main Paper Stock Co., 23-31 Peck Slip, New York City.
New York Overseas Co., 17 Battery Place, New York City.
Storm & Bull, 2 Rector St., New York City.
E. B. Thomas & Co., Inc., 100 Hudson St., New York City.
Interstate Pulp and Paper Co., Grand Central Bldg., New York City.
Lagerloef Trading Co., 18 E. 41st St., N. Y. C.
Parsons Trading Co., 17 Battery Place, N. Y. C.

PAPER MACHINES
Beloit Iron Works, Beloit, Wis.
The Black-Clawson Co., Hamilton, Ohio.

PAPER MANUFACTURERS
Bardeen Paper Co., Otsego, Mich.
Bogalusa Paper Co., Inc., Bogalusa, La.
Bryant Paper Co., Kalamazoo, Mich.
Lakeside Paper Co., Neenah, Wis.
Monarch Paper Co., Kalamazoo, Mich.
Munising Paper Co., Munising, Mich.
Northern Paper Mills, Green Bay, Wis.
Rex Paper Co., Kalamazoo, Mich.
Ticonderoga Pulp & Paper Co., 200 Fifth Ave., New York City.
Watervliet Paper Co., Watervliet, Mich.
Wausau Sulphate Fibre Co., Mosinee, Wis.
Wolverine Paper Co., Otsego, Mich.

PAPER MANUFACTURERS' SUPPLIES
J. Andersen & Co., 21 East 40th St., New York City.
Robert Blank, 140 Nassau St., New York City.
Francis Hughes Co., 21st St. and Loomis Ave., Chicago.
E. J. Keller Company, 200 Fifth Ave., N. Y. C.
Gatti-McQuade Co., 200 Rifth Ave., New York City.
Martin Spinelli, 132 Nassau St., New York City.
Main Paper Stock Co., 25-31 Peck Slip, New York City.
Mendelson Bros. Paper Stock Co., 910 Michigan Ave., Chicago.
New York Overseas Co., Inc., 17 Battery Place, New York City.
E. B. Thomas & Co., Inc., 100 Hudson St., New York City.

PAPER STOCK CUTTERS
Taylor, Stiles & Co., Riegelsville, N. J.

PAPER TESTERS
B. F. Perkins and Son, Inc., Holyoke, Mass.
The Widney Co., Chicago, Ill.

PARCHMENT MANUFACTURERS
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Sutherland Paper Co., Kalamazoo, Mich.

POWER TRANSMISSION
The Hill Clutch Co., Cleveland, Ohio.

PRINTERS' ROLLERS
American Printers' Roller Co., 316 West Grand Ave., Chicago, Ill.

PULP (Chemical)
American Transmarine Co., 13 Park Row, New York City.
J. Andersen & Co., 21 East 40th St., New York City.
Eastern Manufacturing Co., 501 Fifth Ave., New York City.
Hart Trading Co., Inc., Tribune Bldg., New York City.
Daniel M. Hicks, 140 Nassau St., New York City.
E. J. Keller Company, 200 Fifth Ave., N. Y. C.
New York Overseas Co., Inc., 17 Battery Place, New York City.
Price & Pierce, Ltd., 30 East 42nd St., New York City.
The Pulp & Paper Trading Co., 21 East 40th St., New York City.
Scandinavian-American Trading Co., 50 East 42d St., New York City.
Lagerloef Trading Co., 18 E. 41st St., N. Y. C.

PULP EXTRACTORS
The Griley-Unkle Eng. Co., Ft. Wayne, Ind.

PULP AND PAPER MACHINERY
Beloit Iron Works, Beloit, Wis.
Moore & White Co., Philadelphia, Pa.
Valley Iron Works, Appleton, Wis.
The Black-Clawson Co., Hamilton, Ohio.

PULP WASHERS
The Green Bay Foundry and Machine Co., Green Bay, Wis.

PUMPS (Paper)
Buffalo Steam Pump Co., Buffalo, N. Y.
Dean Bros., Indianapolis, Ind.

PUMPS (Vacuum)
American Steam Pump Co., Battle Creek, Mich.
Buffalo Foundry and Machine Co., Buffalo, N. Y
Thos. H. Savery, Republic Bldg., Chicago, Ill.
Dean Bros., Indianapolis, Ind.

RAG AND PAPER DUSTERS
Holyoke Machine Co., Holyoke, Mass.

ROTARY VACUUM PUMPS
Sandusky Foundry & Machine Co., Sandusky, O.

RUBBER ROLLS
United States Rubber Co., New York and Chicago

ROLL GRINDING
Bevis & Shartle Mch. Co., Middletown, O.

ROLL WRAPPING MACHINES:
Nekoosa Motor & Machine Co., Nekoosa, Wis.

ROTARY SCREEN
Thos. H. Savery, Republic Bldg., Chicago, Ill

SAVE-ALLS
The Green Bay Foundry and Machine Co., Green Bay, Wis.

SAWS
Simonds Manufacturing Co. Fitchburg, Mass.

SCREEN PLATES
Central Mfg. Co., Kalamazoo, Mich.
Union Screen Plate Co., Fitchburg, Mass.
William A. Hardy & Sons, Fitchburg, Mass.

SCREEN DIAPHRAGMS
United States Rubber Co., Chicago, Ill.

SHOWER PIPES
Sandusky Foundry and Machine Co., Sandusky. Ohio.

SLITTING AND REWINDING MACHINERY
Cameron Machine Co., Brooklyn, N. Y.

SPEED CHANGES
Moore and White Co., Philadelphia, Pa

STEAM JET CONVEYORS
American Steam Conveyor Corp., Chicago, Ill.

STOCK CIRCULATING SYSTEM
Claflin Engineering Co., Lancaster, Ohio.
Ticonderoga Machine Works, Ticonderoga, N. Y.

STOCK PUMPS
Buffalo Steam Pump Co., Buffalo, N. Y.

STOCK SHREDDER
The Green Bay Foundry and Machine Co., Green Bay, Wis.

SUCTION ROLLS
Sandusky Foundry and Machine Co., Sandusky, Ohio.

SULPHUR
Union Sulphur Co., 17 Battery Place, New York City.

SULPHUR BURNERS
Valley Iron Works Co., Appleton, Wis.

TIERING MACHINES
Economy Engineering Co., Chicago, Ill.

TURBINES (Water)
James Leffel and Co., Springfield, Ohio.

VACUUM SYSTEMS
Open Coil Heater and Purifier Co., Indianapolis, Ind.

VALVES
The Crane Co., Chicago, Ill.

VARIABLE SPEED ENGINES
The Brownell Co, Dayton, O.
Chandler and Taylor, Indianapolis, Ind.
Erie Engine Works, Erie, Pa.
Hooven, Owens, Rentschler Co., Hamilton, O.

VENTILATING SYSTEMS
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.
Buffalo Steam Pump Co., Buffalo, N. Y.
B. F. Perkins and Son, Inc., Holyoke, Mass.

WASHER WIRES
The W. S. Tyler Co., Cleveland, O.

WASTE PAPER STOCK
Gatti-McQuade Co., 200 Fifth Avenue, New York City.
Francis Hughes Co., 21st and Loomis Street, Chicago.
Main Paper Stock Co., 23-31 Peck Slip, New York City.
F. G. Marquardt, Inc., 345 Broadway, N. Y. C.
Martin Spinelli, 132 Nassau St., New York City.
Mendelson Bros. Paper Stock Co., 910 S. Michigan Blvd., Chicago, Ill.
E. B. Thomas & Co., Inc., 100 Hudson St., New York City.

WATER FILTER
The Green Bay Foundry and Machine Co., Green Bay, Wis.

WATER HEATERS:
The Sims Co., Erie, Pa.

WATER-SOFTENING AND PURIFYING SYSTEMS
Wm. Graver Tank Works, East Chicago, Ind.
Wm. B. Scaife and Sons Co., Oakmont, Pa.

WATER WHEELS
James Leffel and Co., Springfield, Ohio.
Holyoke Machine Co., Holyoke, Mass.

WET MACHINES
Valley Iron Works Co., Appleton, Wis.

WIRE SIGNS
Cheney Bigelow Wire Works, Springfield, Mass.

WRAPPING MACHINES
Nekoosa Motor and Machine Co., Nekoosa, Wis.

FOURDRINIER WIRES

Dandy Rolls *Cylinder Molds*

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Cheney Bigelow Wire Works

Established 1842 SPRINGFIELD, MASS.

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for Paper Mills

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Beater Bars — *Bed Plates* — *Rag Knives* — *Paper Shear Blades*

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Write *DOWD* of Beloit on your cutting problems and profit by a very valuable experience.

R. J. DOWD KNIFE WORKS

Makers of Better Cutting Knives Since 1847

Beloit, Wisconsin

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Buyers' Guide—What and Where to Buy

Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

ADHESIVES
The A .P. R. Mfg. Co., 316 West Grand Ave., Chicago.
E. F. Russ Co., 201 Devonshire St., Boston, Mass.

ACID RESISTING BRONZE
Sandusky Foundry & Machine Co., Sandusky, Ohio.
William A. Hardy & Sons, Fitchburg, Mass.

AGITATOR EQUIPMENT
The Hill Clutch Co., Cleveland, Ohio.
Moore & White Co., Philadelphia, Pa.

AIR CONDITIONING AND CONTROL APPARATUS
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.

ANGLE VALES
The Crane Company, Chicago, Ill.

ARCHITECTS
James L. Carey, 208 N. Laramie St., Chicago.

ASSORTING TABLES
Moore and White Co., Philadelphia, Pa.

ASH CONVEYOR SYSTEMS
American Steam Conveyor Corp., Chicago, Ill.

BARKERS
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works Co., Appleton, Wis.

BARKING DRUMS
H. O. Numan, Green Bay, Wis.

BEATER BARS
John W. Bolton & Sons, Inc., Lawrence, Mass.
R. J. Dowd Knife Works, Beloit, Wis.
L. & I. J. White Co., Buffalo, N. Y.
Simonds Manufacturing Co., Fitchburg, Mass.

BEATER BED PLATES
John W. Bolton & Sons, Inc., Lawrence, Mass.
R. J. Dowd Knife Works, Beloit, Wis.
L. & I. J. White Co., Buffalo, N. Y.
Simonds Manufacturing Co., Fitchburg, Mass.

BEATER ROLL FILLING
John W. Bolton & Sons, Inc., Lawrence, Mass.
R. J. Dowd Knife Works, Beloit, Wis.
L. & I. J. White Co., Buffalo, N. Y.
Simonds Manufacturing Co., Fitchburg, Mass.

BEATING, WASHING AND BLEACHING ENGINES
Beloit Iron Works, Beloit, Wis.
The Black-Clawson Co., Hamilton, Ohio.
Dilts Machine Co., Inc., Fulton, N. Y.
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works Co., Appleton, Wis.

BEATERS (Continuous)
Claflin Engineering Co., Lancaster, Ohio.
The Griley-Unkle Eng. Co., Ft. Wayne, Ind.

BELTING (Rubber)
United States Rubber Co., New York and Chicago

BELT DRIVES
The Hill Clutch Co., Cleveland, Ohio.

BLEACHING (Propellers)
Moore and White Co., Philadelphia, Pa.

BLOWERS
Buffalo Steam Pump Co., Buffalo, N. Y.

BOARD MACHINES
Beloit Iron Works, Beloit, Wis.

BOARDS (Straw)
The C. L. La Boiteaux Co., Cincinnati, O.

BRASS WIRE CLOTH
Appleton Wire Works, Appleton, Wis.
Cheney Bigelow Wire Works, Springfield, Mass.
Lindsay Wire Weaving Co., Cleveland, Ohio.
W. S. Tyler Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.

BRIMSTONE
Union Sulphur Co., 17 Battery Place, New York City.

BRONZE JACKETS
Sandusky Foundry & Machine Co., Sandusky, Ohio.

BUNDLING SYSTEMS
Signode System, Lake St., Chicago

CALENDERS
Beloit Iron Works, Beloit, Wis.
Holyoke Machine Co., Holyoke, Mass.
The Black-Clawson Co., Hamilton, Ohio.
Dilts Machine Co., Inc., Fulton, N. Y.

CALENDER DOCTORS
Ticonderoga Machine Works, Ticonderoga, N.Y.

CALENDER ROLLS
Holyoke Machine Co., Holyoke, Mass.
B. F. Perkins and Son, Inc., Holyoke, Mass.

CENTRIFUGAL PUMPS
American Steam Pump Co., Battle Creek, Mich.
Buffalo Steam Pump Co., Buffalo, N. Y.
Valley Iron Works Co., Appleton, Wis.

CHIPPERS
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works Co., Appleton, Wis.

CHIPPER AND BARKER KNIVES
John W. Bolton & Sons, Inc., Lawrence, Mass.
L. & I. J. White Co., 85 Columbia St., Buffalo, N. Y.
Simonds Manufacturing Co., Fitchburg, Mass.
R. J. Dowd Knife Works, Beloit, Wis.

CLAYS AND FILLERS
Binney & Smith Co., 81 Fulton St., N. Y. C.
Daniel M. Hicks, 140 Nassau St., New York City.
The John W. Higman Co., Inc., 29 Broadway, New York City.
Miner-Edgar Co., 30 Church St., New York City.
International Pulp Co., 41 Park Row, N. Y. C.

COAL BUNKERS
The Brownhoist Co., Cleveland, Ohio.

COATED PAPERS
Bardeen Paper Co., Otsego, Mich.
Bermingham & Prosser, Chicago, Ill.
Bryant Paper Co., Kalamazoo, Mich.
Monarch Paper Co., Kalamazoo, Mich.
Rex Paper Co., Kalamazoo, Mich.
Seaman Paper Co., Chicago, Ill.
Watervliet Paper Co., Watervliet, Mich.

CRANES
The Brownhoist Co., Cleveland, Ohio.
John F. Byers Co., Ravenna, Ohio.
Northern Engineering Works, Detroit, Mich.
The Chisholm-Moore Mfg. Co., Cleveland, O.

CYLINDER MOLDS
Appleton Wire Works, Appleton, Wis.
Cheney Bigelow Wire Works, Springfield, Mass.
W. S. Tyler Co., Cleveland, Ohio.

DANDY ROLLS
Appleton Wire Works, Appleton, Wis.
Central Mfg. Co., Kalamazoo, Mich.
Cheney Bigelow Wire Works, Springfield, Ohio.
Lindsay Wire Weaving Co., Cleveland, Ohio.
W. S. Tyler Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.

DECKEL FRAME SUPPORTS
Huband and Nash, Menasha, Wis.

DRUM WINDERS
Ticonderoga Machine Co., Ticonderoga, N. Y.

DRYER FELTS
Appleton Woolen Co., Appleton, Wis.
F. C. Huyck & Sons.
Shuler and Benninghofen, Hamilton, Ohio.

DYESTUFFS
Binney & Smith, 81-83 Fulton St., N. Y. City.
E. I. Du Pont de Nemours & Co., Wilmington, Del.

ELEVATORS (Portable)
Economy Engineering Co., Chicago, Ill.

ELECTRIC FANS
B. F. Perkins and Sons, Inc., Holyoke, Mass.

ELECTRIC HOISTS
John F. Byers Machine Co., Ravenna, Ohio.
Northern Engineering Co., Detroit, Mich.

ELEVATING TRUCKS
Economy Engineering Co., Chicago, Ill.
Moore and White, Philadelphia, Pa.

ENGINES
Chandler and Taylor, Indianapolis, Ind.
Erie Engine Works, Erie, Pa.
Hooven, Owens, Rentschler Co., Hamilton, Ohio.

ENGINEERS
James L. Carey, 208 North Laramie St., Chicago, Ill.

EVAPORATORS:
Buffalo Foundry & Machine Co., Buffalo, N. Y.

FASTENERS (Screen Plate)
Union Screen Plate Co., Fitchburg, Mass.

FELTS AND JACKETS
Appleton Woolen Co., Appleton, Wis.
F. C. Huyck & Sons, Albany, N. Y.
Shuler and Benninghofen, Hamilton, Ohio.

FELT AND WIRE GUIDES
Huband and Nash, Menasha, Wis.
Moore & White Co., Philadelphia, Pa.

FOURDRINIER WIRES
Appleton Wire Works, Appleton, Wis.
Cheney Bigelow Wire Works, Springfield, Mass.
Lindsay Wire Weaving Co., Cleveland, Ohio.
W. S. Tyler Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.

FIBRE MAKING PROCESSES
Hall, Ward & Walker, Inc., Sherman Bldg., Watertown, N. Y.

FILTER (Continuous Suction)
Green Bay Foundry & Machine Co., Green Bay, Wis.

FRICTION CLUTCHES
The Hill Clutch Co., Cleveland, Ohio.
Moore and White Co., Philadelphia, Pa.

GEARS
The Hill Clutch Co., Cleveland, Ohio.

GLUES
American Printers Roller Co., Chicago, Ill.
E. F. Russ Co., 201 Devonshire St., Boston, Mass.

GRINDERS
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works, Appleton, Wis.

HEATERS (Feed Water)
The Sims Co., Erie, Pa.

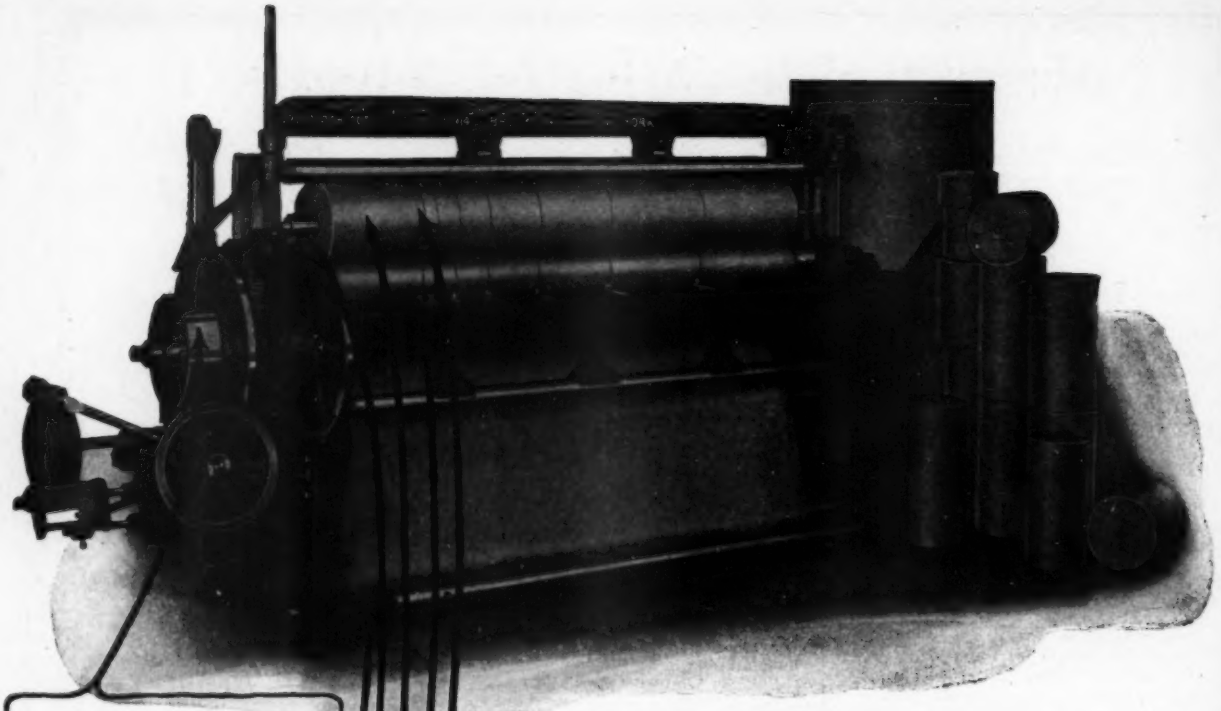
HOISTING AND CONVEYING SYSTEMS
John F. Byers Machine Co., Ravenna, Ohio.
Northern Engineering Co., Detroit, Mich
The Chisholm-Moore Mfg. Co., Cleveland, Ohio.

HOSE
United States Rubber Co., Chicago, Ill.

HYDRAULIC TURBINES
Holyoke Machine Co., Holyoke, Mass.
James Leffel and Co., Springfield, Ohio.

IRON CASTINGS
Beloit Iron Works, Beloit, Wis.
Valley Iron Works Co., Appleton, Wis.

JORDAN FILLINGS
J. W. Bolton & Sons, Inc., Lawrence, Mass.



High Speed Drive

Treadle Control Variable Speed

Even Edges

Firm Even Tensioned Rolls

Quick Change of Cutters

Clean Cut

A FEW Important Features of the Cameron Principle Slitting and Rewinding Machine

The advantage of the Cameron "Score Cutter" method, considered apart from the fact that it is the ideal method to combine with the Surface Rewind, may be summed up as follows:

1. The "Score Cutter" does perfect work on any kind of paper made, as well as fabrics and other materials.

2. The "Score Cutter" gives a clean, smooth slit and does not stretch the edge of the paper.

3. The "Score Cutter" will operate perfectly at unlimited speed as there is practically no friction or wear on the cutting edge.

4. The "Score Cutter" need not be kept to any special diameter, as the pressure spring will take up any variation.

5. The "Score Cutter" does not have a keen cutting edge, but an edge slightly blunt like a cold chisel, and it is easily kept in prime condition by the operator.

6. The same features which make the "Score Cutter" efficient for light duty, make it equally serviceable for heavy duty, as it will handle work from the sheerest tissue paper up to box board.

7. Re-spacing of "Score Cutter" is quickly done by simply releasing the spring pressure on all the cutters at once, and sliding the cutter holders to the new positions.

8. Re-spacing of "Score Cutters" requires only five to ten minutes for any new arrangement of widths. When Gang Spacers are used for narrow strip, even less time is required.

9. Removing or replacing a cutter requires only to lift it on or off its support—holder and all—without disturbing any other cutter or any part of machine.

10. Any width or assortment of widths can be spaced from one-quarter inch up.

11. Strip as narrow as one-quarter inch can be produced by special "Score Cutters."

12. The waste or trim at the edges may be extremely narrow.

13. The rolls produced do not interweave or stick together.

14. Injury to the operator by this method of slitting is impossible.

Send for illustrated catalog

CAMERON MACHINE COMPANY

57-61 Poplar Street, Brooklyn, N. Y.

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When writing them, please mention The Paper Industry

A

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